AN INVESTIGATION OF THE SCHOOLING EXPERIENCES OF RURAL WORK-BOUND YOUTH: A PERSON-ORIENTED APPROACH

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ABSTRACT

Bryan Clark Hutchins: An Investigation of the Schooling Experiences of Rural Work-Bound Youth: A Person-Oriented Approach
(Under the direction of Judith L. Meece)

The benefits of postsecondary education (PSE) attainment are greater now than ever before given today's changing global economy. Despite rising enrollments, an alarming number of youth drop out of college without attaining any credential. Also, a small, but substantive group never attempt PSE. Rural youth, compared to nonrural youth, are less likely to enroll in a PSE institution and are more likely to drop out and enter the workforce before completing school. Drawing on Bronfenbrenner's bioecological model and person-oriented analysis, the purpose of this study was to explore interindividual differences among a diverse sample of 1,655 rural work-bound youth. The study was guided by three aims: 1) explore whether meaningful subgroups of work-bound youth could be identified using cluster analysis on students' self-reported educational and occupational aspirations, work orientations, family hardship, and academic achievement; 2) evaluate how identified groups differed on perceived future educational and occupational barriers and opportunities; and 3) explore group differences on students' subjective evaluations of their schooling experiences.

Analysis revealed six distinct groups. Three groups (*ambitious*, *persistent*, and *well rounded*) generally evidenced high aspirations and positive schooling experiences. Three groups (*average*, *multiple disadvantage*, and *work focused*) generally evidenced lower aspirations and more negative schooling experiences. *Persistent*, *multiple-disadvantage*, and *work-focused* youth reported higher educational barriers compared to other groups, but *work-focused* youth reported

the lowest occupational barriers compared to all other groups. Findings may inform researchers, policymakers, and practitioners seeking more nuanced approaches to meet the transition needs of youth who do not continue or complete postsecondary education.

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CHAPTER 1: INTRODUCTION

In today's changing global economy, youth are encouraged to pursue postsecondary education (PSE) as a way to improve their chances of a successful transition to adulthood (Rosenbaum, Ahearn, Becker, & Rosenbaum, 2015; Schneider, 2009). Such encouragement from parents, teachers, community leaders, and policymakers is understandable given that PSE attainment has been linked to outcomes such as higher earnings, career satisfaction and stability, better health, and overall life satisfaction (Danzinger & Ratner, 2010). Despite these benefits and the ubiquitous message about the importance of PSE, approximately one-third of the class of 2015 did not enroll in any PSE institution after graduation (Bureau of Labor Statistics, 2016). In addition, only 59.6% of the most recent cohort of youth who enrolled in a four-year institution graduated within six years while only 27.9% of those who enrolled in a two-year institution graduated within three years (National Center for Education Statistics, 2015a; 2015b).

Despite our efforts, approximately half of our youth either do not attempt or do not attain a PSE credential (Rosenbaum et al., 2015). Though reasons are varied, these work-bound youth[1] are more likely to come from backgrounds characterized by economic hardship and inadequate educational preparation (Deil-Amen & Turley, 2007; Juntunen & Wettersten, 2005; Rojewski & Kim, 2003). Most enter the workforce with little exposure to career development opportunities in high school and few opportunities to take part in school to work (STW) transition programs and

[1] Various terms appear in the literature to describe those who do not attempt or attain a PSE credential. More common terms include "non-college bound" and "non-college-educated." Burnell (2003) suggests using "work-bound" as this implies who these youth are and the focus of their transition experience rather than who they are not. I use "work-bound" while acknowledging the popularity of college-oriented terms and the lack of precision inherent in using "work-bound" as it implies that all youth who do not attain PSE are work-oriented or in the workforce.

services designed specifically for their needs. Given these hardships, most work-bound youth will experience obstacles in the transition to adulthood without some form of PSE (Carnevale, Jayasundera, & Gulish, 2016; Halperin, 1998; Rosenbaum et al., 2015; W. T. Grant Foundation, 1988).

Rural youth have high aspirations and are enrolling in PSE in ever greater numbers, but enrollment and attainment is still lower among rural youth compared to nonrural youth (Byun, Meece, & Irvin, 2012; Byun, Irvin, & Meece, 2015; Meece et al., 2013; Snyder & Dillow, 2010). Much of this disparity is the result of economic inequality rather than rurality per se (Byun et al., 2012; Byun et al., 2015). In fact, rural contextual factors such as strong connections between schools, families, and the community are often found to positively influence youth development (Crockett, Shanahan, & Jackson-Newsom, 2000; Elder & Conger, 2000). Despite these supports, rural youth are more likely to be work bound than nonrural youth (Rojewski, 1999). Given that rural work-bound youth face potential hardships related to poverty, geographic isolation, lack of career development opportunities, and limited job prospects, developing a better understanding of the diverse experiences of these youth is important for designing programs and services to meet their transition needs (Crockett et al., 2000; Hutchins, Meece, Byun, & Farmer, 2012; Rojewski, 1999).

Statement of the Problem

Most research on the transition to adulthood focuses on economically and educationally advantaged youth who complete PSE (Bozick & DeLuca, 2011; Dietrich, Parker, & Salmela-Aro, 2012; Juntunen & Wettersten, 2005). Work-bound youth are virtually ignored in many reviews on the transition to adulthood other than to note that these youth are at risk for poor transition outcomes (Arnett, 2004; Eccles, Templeton, Barber, & Stone, 2003; Smith & Reio,

2006; Zarrett & Eccles, 2006). Most findings on work-bound youth come from studies of nonrural youth or studies comparing work-bound youth to college-bound youth with results indicating that work-bound youth lag behind college-bound youth on most factors under consideration (Hutchins et al., 2012; Rojewski, 1999; Rojewski & Kim, 2003). A problem with this design is the implicit assumption that PSE attainment is a goal of all youth, thus the goals, motivations, and achievements of college-bound youth become the standard against which work-bound youth are evaluated (Bozick & DeLuca, 2011). Though many work-bound youth come from disadvantaged backgrounds, experience problems in school, and experience problems transitioning to adulthood, some do not. Some are purposeful in their transition preparations, have contextual supports, and are satisfied with their transitions despite the lack of PSE (Blustein, Philips, Jobin-Davis, Finkelberg, & Roarke, 1997; Blustein et al., 2002; Bozick & DeLuca, 2011).

Although many investigators have pointed out that work-bound youth are diverse in terms of motivations, goals, aspirations, and levels of contextual support (Hamilton & Hamilton, 2006; Herr & Niles, 1997; Juntunen & Wettersten, 2005), it is surprising that relatively few studies of work-bound youth use theoretical and analytical frameworks to capture this diversity. One example of this type of approach is person-oriented analysis, which is designed to explore interindividual differences on developmental experiences by identifying homogenous subgroups of individuals as the unit of analysis (Bergman & Trost, 2006; von Eye & Bergman, 2003). Person-oriented analysis is particularly valuable for uncovering and understanding groups of individuals whose behaviors and experiences differ from those who follow more commonly established developmental pathways (e.g., von Eye, Bogat, & Rhodes, 2006).

To be sure, there are studies that are consistent with person-oriented analysis that have uncovered important differences among work-bound youth, particularly understanding why some work-bound youth enter the workforce after high school despite being academically prepared (e.g., Burnell, 2003; Hahn & Price, 2008) or facing little economic hardship (Blustein et al., 2002; Bozick & DeLuca, 2011). One problem with many of these studies is that interindividual differences among work-bound youth are evaluated using single dimensions or simple dichotomies (e.g. high vs. low socioeconomic status, high vs. low academic achievement). STW transition outcomes, particularly PSE enrollment and attainment, are influenced by a complex interplay of individual and contextual factors (Deil-Amen & Turley, 2007; Eccles, Vida, & Barber, 2004); Missing from the literature are studies that use analytic techniques designed to capture the variance and heterogeneity among work-bound youth using a wider range of developmental experiences.

An equally important problem is that most studies of work-bound youth focus on nonrural youth, which means less is known about the challenges and opportunities that rural youth perceive in the STW transition despite the fact that rural youth represent 20% of students in the U.S. (Johnson & Strange, 2007). Rural youth face unique challenges, such as the tension between staying in the community and leaving to find work or PSE opportunities (Petrin, Schafft, & Meece, 2014). However, rural youth may also have opportunities that are unavailable to nonrural youth that may be especially helpful for work-bound youth. For example, rural youth often benefit from greater connections to families, schools, and the community (Crockett et al., 2000). Such connections may help rural work-bound youth find employment within the community after high school. Given the challenges and opportunities that rural work-bound youth face, the lack of research on these youth, and the fact that rural youth are more likely to

enter the workforce directly after high school, there is a clear need for more research on how these youth perceive opportunities and barriers to their future plans.

Additionally, less is known about how subgroups of work-bound youth differ on schooling experiences given that most major studies of work-bound youth identify these youth as a single group and then compare these youth to college-bound youth (e.g., Rojewski, 1999; Rojewski & Kim, 2003). Work-bound youth, compared to college-bound youth, evidence a variety of negative schooling experiences including lack of engagement, poor academic performance, and lower levels of involvement in career preparation (Deil-Amen & Turley, 2007; Juntunen & Wettersten, 2005; Hutchins et al., 2012). However, not all work-bound youth experience academic problems, hold negative views about the importance of school, or fail to take part in school-based programs and curricula that promote career and work skills development (Blustein et al., 2002; Bozick & DeLuca, 2011; Burnell, 2003; Neumark & Rothstein, 2007). Although there has been some work around how work-bound youth differ on academic achievement, aspirations, and curriculum participation, there is less work available on how these youth differ on specific perceptual experiences of schooling, such as competency and value beliefs (e.g. academic self-concept, valuing, belonging) as well as participation in potentially career enhancing activities such as career exploration (Hutchins et al., 2012). As such, it is important to explore the schooling experiences of work-bound youth as some may be more engaged and use school to inform decisions around the transition to work, whereas others may be less engaged and leave school less prepared for work.

Purpose of the Study

The purpose of this study was to address limitations in the literature using data from the Rural High School Aspirations (RHSA) study on 1,655 rural work-bound youth who did not

continue their education beyond high school or left PSE before completing any degree. This study was descriptive in nature and as such, designed to identify areas for future research by addressing three primary aims. Given the treatment of work-bound youth as homogenous samples in previous studies, the first aim was to use cluster analytic techniques (Bergman, Magnusson, & El-Khouri, 2003; Bergman & Trost, 2006) to identify groups of similar work-bound youth using a wider range of factors than has been used in previous subgroup analyses (e.g., Hahn & Price, 2008). For this study, cluster analysis was conducted using work-bound youth's PSE and occupational aspirations, work orientations, perceived family economic hardship, and academic achievement. These factors were selected because they predict STW transition outcomes[2], have been found to differentiate subgroups of work-bound youth in meaningful ways, and in the context of this study may indicate why certain groups of work-bound youth do not complete PSE. More importantly, the identification of reliable and valid clusters of work-bound youth that evidence meaningful differences on other indicators in this study may provide an impetus for other investigators of work-bound youth to make greater use of person-oriented analysis.

The second aim was to explore how the identified groups of rural work-bound youth differed in their perceptions of job opportunities in the local community as well as perceptions of PSE and occupational barriers. Perceptions of contextual opportunities and barriers can influence how youth formulate and enact future plans (Lent, Brown, & Hackett, 1994; 2000). One area of neglect in the literature is the lack of research on how work-bound youth themselves view STW transition opportunities and barriers, particularly among work-bound youth with varying levels of family support and academic preparation (Bozick & DeLuca, 2011). Although the RHSA study does not include self-reported reasons why participants did not continue their education or

[2] Particularly PSE enrollment (Deil-Amen & Turley, 2007).

attain a PSE credential, available information on perceived work and educational opportunities and barriers assessed at high school may uncover differences between identified groups of rural work-bound youth that suggest why these youth did not continue or complete PSE.

The third aim of this study was to explore how the identified groups differed in their perceptions of their schooling experiences. Three variables were selected to assess competency and value beliefs about school (academic self-concept, school valuing, and school belonging) and three variables were selected to assess engagement in specific activities designed to improve STW transitions (participation in career counseling, participation in career exploration, and program of study participation). The literature on work-bound youth suggests that these youth are often less engaged in school as a result of feeling that their goals and aspirations may not be valued if they have lower aspirations or more work-oriented goals (Burnell, 2003; Krei & Rosenbaum, 2001; Rosenbaum et al., 2010). However, not all work-bound youth have low aspirations, low academic achievement, or are particularly oriented toward work (Bozick & DeLuca, 2011). In order to better serve the needs of these youth, it is important that we understand who is more engaged in school and why.

This study will contribute to the literature in three ways. First, this study is one of the first to identify subgroups of rural work-bound youth using a person-oriented or cluster-analytic approach. Results from this study may provide a more nuanced perspective on who these rural work-bound youth are and reasons why they did not continue or complete their education beyond high school. Second, by exploring the schooling experiences of subgroups of work-bound youth, results may help educators, researchers, and policymakers better understand which groups of work-bound youth are more actively engaged in school, particularly in career enhancing

activities, and how these youth differ from those who are less engaged in school and more likely to leave school less prepared for the transition to work.

Third, given the paucity of research on work-bound youth using a person-oriented analytic framework and the descriptive nature of this investigation, results from this study may provide information in areas such as variable selection and overall study design so that future investigators can more effectively identify variables and methods to study the diverse experiences of rural work-bound youth. Every effort was made to select theoretically relevant variables and to use analytic techniques that were consistent with prior work on work-bound youth (e.g., Bozick & DeLuca, 2011; Rojewski & Kim, 2003). However, given the uniqueness of this analysis and some of the limitations in the literature, one goal was to provide methodological information to inform future work.

CHAPTER 2: REVIEW OF THE LITERATURE

I begin this chapter by discussing the guiding conceptual framework. This study was guided by Bronfenbrenner's bioecological model (Bronfenbrenner & Morris, 2006) for theoretical support and person-oriented analysis for an analytic guide (Bergman et al., 2003). Next, I provide an overview of the STW transition, emphasizing recent economic and labor market trends, and the role of PSE as context for this investigation. I then review the literature on work-bound youth, particularly studies of interindividual differences within this population. Next, I discuss schooling experiences of work-bound youth, emphasizing career-enhancing activities that may be particularly important for these youth. Finally, I discuss limitations in prior work and present research questions addressed in this study. Because multiple studies cited in the literature review and other chapters come from the RHSA study, I provide a summary of cited studies in Appendix A for readers interested in the work conducted by RHSA investigators.

Guiding Conceptual Framework

Numerous frameworks have been used to understand the STW transition, but a limitation of most studies is a focus on more economically and educationally advantaged youth (Eccles et al., 2003; Lent & Worthington, 1999; Schwartz, Côté, & Arnett, 2005; Worthington & Juntunen, 1997; Worthington et al., 2005). A limitation of the work-bound youth literature in particular is a lack of studies that explore the bidirectional influence of the person in context as well as studies that explore interindividual differences within this population (Bozick & DeLuca, 2011; Juntunen & Worthington, 2005; Ling & O'Brien, 2013). Given these limitations, the current study utilized Bronfenbrenner's bioecological model as a guiding conceptual framework along

with person-oriented analysis which seeks to understand individuals with similar developmental experiences and is consistent with the bioecological model.

Overview of the Bioecological Model

Bronfenbrenner's bioecological model is an extension of his earlier ecological systems theory that focused on how contextual factors influence development within five concentric systems of influence including the *microsystem*, *mesosystem*, *exosystem*, *macrosystem*, and *chronosystem* (Bronfenbrenner, 1979). The microsystem represents an individual's immediate environment such as the home or school. The mesosystem, exosystem, and macrosystem represent more distal influences (i.e., broader social, political, and economic forces) that directly and indirectly influence development. The final level, the chronosystem, represents changes in the individual and context across historical time (Bronfenbrenner & Morris, 2006). The bioecological model retains these systems, but greater emphasis is placed on the bidirectional interaction between individuals and their environments or what developmental researchers call the *person-in-context system* (Bergman & Magnusson, 1994; Cairns & Cairns, 1994).

For Bronfenbrenner, the primary mechanisms of development is the *proximal process* which he defined as, "the processes of progressively more complex reciprocal interactions between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate external environment" (Bronfenbrenner & Morris, 2006, p. 797). To promote development, a person must regularly engage in developmentally supportive activities in his or her immediate context and these activities must become more complex over time. In the context of this study, a proximal process could be work-bound youth taking part in career development activities that expose them to college and career information.

Before discussing how proximal processes unfold, it is important to emphasize the more recent model's distinction between *environment* and *process*. Relevant features of an environment not only include objective properties, but also how the environment is subjectively experienced by the individual (Bronfenbrenner & Morris, 2006). For example, while structural characteristics of a school (e.g., size, location) play an important role in creating a context for development, from an ecological perspective, a student's subjective evaluation of school (e.g. sense of belonging, academic self-concept) plays an equally important role (Eccles & Roeser, 2010; Roeser, Urdan, & Stephens, 2009). Bronfenbrenner stressed the importance of understanding both objective features of the environment and subjective experiences of that environment, particularly when these elements do not operate in the same direction.

The way that individuals subjectively evaluate their environments and engage in proximal processes is influenced by *force*[3], *resource*, and *demand* characteristics of the individual. Force characteristics are behavioral dispositions (e.g., interests) that can set proximal processes into motion, sustain their operations, or impede these activities from taking places. Resource characteristics are defined as "biopsychological liabilities and assets that influence the capacity of the organism to engage effectively in proximal processes" (Bronfenbrenner & Morris, 2006, p. 812) such as knowledge, skills, and abilities. Demand characteristics are characteristics that can invite or discourage reaction from the social environment. Two important demand characteristics are gender and ethnicity given that these characteristics may influence reactions from others in the microsystem (Tudge, Mokrova, Hatfield, & Karnik, 2009).

Implications for Analysis

Work-bound youth come to school with different dispositions and resources (e.g., academic orientation, achievement) that influence how they perceive school, which in turn

[3] Also referred to as dispositions.

influences their levels of engagement. For example, suppose two work-bound students at the same school have low educational and occupational aspirations, yet one values school more and takes part in various extracurricular activities. School personnel may take notice and attempt to collaborate more with this student. As a result, this student may be encouraged to enroll in a specialized academic or career program whereas the other student may go unnoticed and miss out on relational support and activity involvement that could promote career development. Exploring how a combination of factors influence work-bound youth's schooling experiences may be more informative than focusing on any single factor.

One way to incorporate the person-in-context approach from the bioecological model into a study design is through person-oriented analysis. The goal of person-oriented analysis is to identify unique patterns among variables within individuals in order to identify groups of individuals with similar developmental experiences (Bergman & Magnusson, 1997; Bergman & Trost, 2006). These groups are identified to explore how they differ on outcomes of interest. Person-oriented analysis, such as cluster analysis, is particularly valuable for uncovering and understanding groups of individuals whose behaviors and experiences differ from those who follow more commonly established developmental pathways (e.g., von Eye et al., 2006).

The person-oriented approach has been used in a number of studies designed to understand how groups of youth with similar characteristics differ from other groups on outcomes such as academic and social functioning (e.g., Estell, Farmer, Irvin, Thompson, & Hutchins et al. 2007; Farmer, Irvin, Sgammato, Dadisman, & Thompson, 2009; Rodkin, Farmer, Pearl, & Van Acker, 2000). However, person-oriented analyses have received considerably less attention in the work-bound youth literature, which is often guided by the more traditional variable-oriented approaches where the level of analysis is the variable and not the individual

(Garrett & Eccles, 2009). This approach is typically used in population-based studies where the goal is to make inferences about relations among variables at the population level.

A limitation of a variable-oriented approach is the assumption that relations among variables function the same for all individuals (Bergman et al., 2003). For example, in multiple regression analysis each variable has the same weight for all individuals and reflects what is characteristic of the average individual unless interaction terms are specified. It is assumed that relations among variables studied at the group level can be used to make inferences about how these variables function within individuals. Such approaches, while informative, can overlook important within-group differences (Bergman & Trost, 2006). Both approaches have merit and investigators using person-oriented analysis stress that both contribute to our understanding of development (Bergman & Trost, 2006; Cairns & Rodkin, 1998). In fact, many studies, including the current study, use both methods by identifying groups with similar experiences using person-oriented methods, followed by variable-oriented analysis where group differences are evaluated in relation to other individual or contextual factors (Bergman & Trost, 2006).

Overview of the School to Work (STW) Transition

The bioecological model posits that interactions between individuals and their proximal contexts (e.g., home, school) exert the greatest influence on development (Bronfenbrenner & Morris, 2006). Although this study is not focused on more distal ecological systems of influence, it is important to briefly provide background information on the broader context for this study by briefly describing the STW transition and the role of PSE in the lives of recent cohorts of youth.

The STW transition is considered the period in which youth leave formal schooling and enter the workforce (Juntunen & Wettersten, 2005). For some, the transition begins at the completion of PSE, but for others it begins after high school. For a growing number, the

transition involves a prolonged combination of work and PSE before transitioning primarily to work (Arnett, 2004; Mortimer, 2010; Symonds, Schwartz, & Ferguson, 2011). Regardless of pathway, late adolescence and early adulthood are important times for youth to engage in career enhancing activities to develop competencies needed for the transition (Eccles et al., 2003; Hamilton & Hamilton, 2006; Shanahan, 2000; Zarrett & Eccles, 2006). A successful transition has been defined differently across disciplines, but PSE and employment attainment are viewed as particularly important given that both improve one's chance of attaining economic self-sufficiency (Blustein, Juntunen, & Worthington, 2000; Crockett & Crouter, 2014; Danzinger & Ratner, 2010; Eccles et al., 2003; Garrett & Eccles, 2009; Shanahan, 2000).

Current labor market trends. Rapid economic, labor, and technological changes have made the STW transition more uncertain for recent cohorts of youth (Schoon & Silbereisen, 2009). Over the past four decades, the U.S. has seen a decrease in the number of unskilled labor jobs as new technologies raise the demand for skilled workers (Danzinger & Ratner, 2010). Rural communities in particular, have seen declines in industries such as farming, mining, and timber harvesting, which typically provide relatively high pay for unskilled labor (Fussel & Furstenberg, 2005; McGranahan, 2003). The South in particular, has experienced a loss in manufacturing jobs that have historically supported middle and low-skilled workers (Beaulieu & Barfield, 2000; McGranahan, 2003). Many rural communities struggle to attract and retain employers due to the lack of skilled workers (Johnson, 2006).

Workers have faced wage stagnation and fewer opportunities for full-time employment with benefits as employers are moving to part-time or contract work (Schoon & Silbereisen, 2009; Wisman, 2013). In many rural areas, agricultural, extraction, and manufacturing jobs have been replaced by service and support jobs that often lack benefits (Fussel & Furstenberg, 2005).

Young workers face higher rates of unemployment as they are often the last to be hired and first to be fired during uncertain times (Choudhry, Marelli, & Signorelli, 2012). Many youth go through a period of *floundering* where they are either unable or unwilling to find stable employment, work in jobs of higher quality, advance in their careers, or pursue jobs that are aligned with their goals (Hamilton & Hamilton, 2006; Kerckhoff, 2002; Vuolo, Mortimer, & Staff, 2014). Rural youth may be more likely to flounder due to lack of job opportunities, particularly for those who lack technical and advanced job skills (Fussel & Furstenber, 2005).

The U.S. is one of the few industrialized nations with no national policies, programs, or services to meet the STW transition needs of work-bound youth (Halperin, 1998; Juntunen & Wettersten, 2005; Rosenbaum, 2001; Symonds et al., 2011; W. T. Grant Foundation, 1988). Recent legislation and policies, such as the No Child Left Behind Act of 2001 and Common Core State Standards, were designed with the goal of improving students' college and career readiness (National Governors Association & Counsel of Chief State School Officers, 2010). However, such initiatives place more emphasis on improving academic rigor, raising standards, and promoting college readiness with less emphasis on career readiness (Rosenbaum et al., 2010). The last major legislative effort to assist work-bound youth specifically was the School-to-Work Opportunities Act of 1994 (STWOA), which set aside $1.5 billion dollars to help schools create career development opportunities in collaboration with local businesses and industries. However, funding for STWOA ended in 1999 (Neumark & Rothstein, 2007).

Role of postsecondary education attainment. Individuals with a bachelor's degree earn, on average, 93% more than those with a high school diploma or less and this earnings gap has widened since the 1970s (Danzinger & Ratner, 2010; Mishel, Bevins, Gould, & Sheirholz, 2012). Understandably, youth today are encouraged to attend college. In fact, most are

encouraged to "give college a try," particularly a four-year degree, even those who have low aspirations, inadequate academic preparation, or unrealistic beliefs about college expectations (Goyette, 2008; Krei & Rosenbaum, 2001; Rosenbaum et al., 2010; Schneider & Stevenson, 1999). Such societal pressure may explain why adolescents today tend to have high, and sometimes unrealistic, educational aspirations (Goyette, 2008; Meece et al., 2013; Reynolds, Steward, MacDonald, & Sischo, 2006; Schneider & Stevenson, 1999).

Despite the benefits of PSE, not all youth benefit equally. For example, college graduates who performed poorly in high school experience considerably fewer economic benefits compared to graduates who were more academically prepared for college (Attewell & Lavin, 2007; Rosenbaum, 2001). Given rising tuition, the number of youth who are unprepared for college (particularly four-year college), and the rise in jobs that require advanced/technical skills, policymakers, educators, and researchers have taken notice of programs in high schools and community colleges that can lead to quality job opportunities that do not require four-year degrees (Arum & Roksa, 2010; Rosenbaum et al., 2010; Symonds et al., 2011). Although most jobs today require some PSE, only about half require a bachelor's or advanced degree (Carnevale, Smith, & Strohl, 2013). In fact, nearly one-third of those with an associate's degree or occupational certificate earn more than those with a bachelor's degree by working in high demand middle skills jobs (Baum, Ma, & Payea, 2013; Carnevale et al., 2013).

Work-Bound Youth

Work-bound youth are not well defined in the literature and do not represent a homogenous group (Hamilton & Hamilton, 2006; Herr & Niles, 1997). Here I provide a summary of work-bound youth that includes: PSE enrollment, demographic characteristics, PSE aspirations, occupational aspirations, work orientations, family hardship, and academic

achievement. The discussion is organized around the clustering variables to justify the use of these variables to explore group differences. Using the bioecological model as a guiding conceptual framework, PSE aspirations, occupational aspirations, and work orientations were conceptualized as important *force* characteristics of the individual that can influence interactions with the school environment. Family hardship was conceptualized as a *resource* characteristic that can influence interactions with the school environment and PSE opportunities. For the purposes of this study, academic achievement was conceptualized as both a *force* and *resource* characteristic because measures of achievement may provide information on a participant's disposition toward school (force) as well as possible preparation for PSE (resource). Finally, demographic characteristics were conceptualized as important *demand* characteristics.

I begin with a discussion of definitions of work-bound youth. Before doing so, it is important to note that given the limited available research on rural work-bound youth specifically, many of the studies reviewed in this section do not focus exclusively on rural youth. Studies focused on rural youth will be included where available and designated as such. The limitations of this existing research and its relevance for rural work-bound youth will be discussed in a subsequent section as a justification for the current study.

Definitions of Work-Bound Youth

Work-bound youth are typically described as those who plan to enter the workforce after high school, but definitions vary (Herr, 1995; Herr & Niles, 1997). For example, some studies define work-bound youth as those who have strong work orientations or intend to work after high school (Herr, 1997; Hutchins et al., 2012; Worthington & Juntunen, 1997). However, some youth enter the workforce due to economic hardship or problematic schooling experiences and do not have particularly strong work orientations, making such definitions problematic (Blustein

et al., 2002; Bozick & DeLuca, 2011). Some authors have defined work-bound youth as those who do not enroll in, or complete a four-year degree (Juntunen & Wettersten, 2005). Under this definition, two-year degree recipients are considered work-bound. Other authors have used imprecise definitions. For example, Rojewski and Kim (2003) defined college-bound youth as those who were "enrolled primarily in school regardless of employment status" (p.93) and work-bound youth as those who were "primarily employed" (p.93) two years after high school. These authors did not elaborate on what it means to be primarily in school or employed, nor did they indicate whether work-bound youth in their study could also be in school.

Definitional issues aside, most researchers, educators, and policymakers seem primarily concerned with those who do not attempt or attain any postsecondary credential regardless of degree level (Halperin, 1998; Rosenbaum et al., 2015; W. T. Grant Foundation, 1988). In addition, although work-bound youth have traditionally been defined as those who plan to work after high school (e.g., Herr & Niles, 1997), Rosenbaum and colleagues (2015) have argued that because most work-bound youth will try, but fail to attain a PSE degree, investigators of work-bound youth should keep in mind that work-bound youth today are primarily college dropouts.

Descriptions of Work-Bound Youth

PSE enrollment. Although work-bound youth are often defined by not attempting PSE, the majority of these youth will attempt PSE at some point. Recent findings from the Educational Longitudinal Study indicated that 86% of students who were in 10th grade in 2002, enrolled in some form of PSE within eight years of high school (Rosenbaum et al., 2015). Although more rural youth are enrolling in PSE institutions (particularly two-year programs), rural youth are less likely to enroll in PSE, or attain a credential compared to nonrural youth (Byun et al., 2012; Provasnik et al., 2007; Rojewski, 1999). In addition, Byun and colleagues (2015) found that rural

youth were more likely to delay PSE entry and be noncontinuously enrolled compared to urban youth. Much of the disparity in PSE outcomes is related to socioeconomic disadvantage and schooling experiences and not rurality per se (Byun et al., 2012; Byun et al., 2015).

Demographics. Male youth are more likely to be work-bound than female youth, a finding that has been replicated for rural youth (Hutchins et al., 2012; Rojewski, 1999; Rojewski & Kim, 2003). When reasons for being work-bound are considered, male youth are more likely to report a desire to work and make money (Bozick & DeLuca, 2011). Proportionally speaking, youth of color are overrepresented among work-bound youth as these youth typically experience lower graduation rates, PSE attendance, and PSE completion (Juntunen & Wettersten, 2005; Kao & Thompson, 2003; Worthington, Flores, & Navarro, 2005). Although African American, Hispanic, and Native American youth have been found to have high educational aspirations, these aspirations tend to be unstable and begin to decline over the course of high school. This decline may be due to the lack of family resources and parents'/guardians' lower levels of education, both of which have been found to strongly influence aspirations (Kao & Thompson, 2003). However, discrepancies between minority and nonminority youth can also be explained by other factors including, but not limited to, more problematic schooling experiences and discrimination (Kao & Thompson, 2003; Worthington et al., 2005).

Postsecondary education aspirations. In general, work-bound youth, including rural work-bound youth, have lower PSE aspirations compared to college-bound youth (Rojewski, 1999; Rojewski & Kim, 2003; Hutchins et al., 2012). However, most work-bound youth recognize the importance of PSE, but many face barriers to pursuing PSE (Blustein et al., 2002;

Herr & Niles, 1997).[4] Rural youth, in particular, may be less able or willing to pursue PSE due to economic barriers, inadequate academic preparation, or career indecision (Hutchins et al., 2012; Provasnik et al., 2007). For others, barriers may be less of an issue. Some rural work-bound youth see college as problematic because it delays the assumption of adult responsibilities. For example, in a study of rural work-bound youth, Burnell (2003) identified a group of high achieving work-bound youth who wanted to work and make money, but did not report disliking school. However, they did dislike the fact that PSE delayed entry into the "real world." Some work-bound youth, particularly those from middle-class backgrounds and those who are college-qualified, have lower aspirations for PSE that may result from the belief that their career goals do not require PSE (Blustein et al., 2002; Burnell, 2003; Hahn & Price, 2008).

An important question is whether such beliefs are reasonable. Drawing on a nationally representative sample of 2,640 work-bound youth from the ELS:2002 dataset, Bozick and DeLuca (2011) found that youth who were work driven and experienced few schooling or economic hardships tended to come from communities where PSE was less necessary for work, suggesting that for some work-bound youth low aspirations and the decision to forgo PSE may be reasonable. Work by Bowen, Chingos, and McPherson (2009) suggested that for some youth, forgoing PSE may be an informed decision that results from career exploration, identity development, and behavioral engagement in school. However, for some, low aspirations may result from ineffective career exploration or lack of quality information around PSE, which can create misunderstandings about the benefits of college and the steps that are necessary to attend.

Occupational aspirations and values. Most work-bound youth have stronger orientations toward work than school and/or desire to assume adult responsibilities earlier than

[4] Given the purpose of this study, it is important to note that no value is placed on these comparative terms. Though aspirations are important, they must be evaluated in relation to other factors (e.g., career goals) before an assessment can be made regarding the degree to which differing aspirations represent liabilities or assets for the individual.

college-bound youth (Burnell, 2003; Garrett & Eccles, 2009; Staff, Schulenberg, & Bachman, 2010; Vuolo et al., 2014). In general, work-bound youth aspire to low- and middle-skilled occupations, whereas college-bound youth aspire to professional and skilled occupations (Bozick & DeLuca, 2011; Rojewski & Kim, 2003). Work-bound youth also tend to differ from college-bound youth in their work values. For example, Johnson and Elder (2002), using data from the Monitoring the Future Survey, found that in a nationally representative sample of youth, work-bound youth, when compared to college-bound youth, desired jobs that were more secure and less altruistic in nature. They placed less importance on jobs that were personally challenging or granted authority, and more emphasis on jobs that allowed them to use their skills and abilities in areas where they could see results. In a study of rural work-bound youth, Burnell (2003) found that while job stability was important, participants rarely mentioned career advancement or taking on additional work-responsibilities like supervising others as a goal. Many aspired to jobs that were, in their words, "average," "just right," or "comfortable" or reported nonwork goals such as spending time with friends and family or taking part in other leisure activities. Taken together, these studies suggested that one reason that some work-bound youth aspire to low- or middle-skilled occupations is that these occupations may reflect their career and personal values.

Family background. One of the strongest predictors of PSE enrollment and attainment is related to family background characteristics, particularly economic hardship and parents' level of education (Deil-Amen & Turley, 2007; Juntunen & Wettersten, 2005; Kao & Thompson, 2003). Studies that have compared work-bound youth to college-bound youth consistently demonstrate that work-bound youth are more likely to come from families with higher economic hardship, lower parental education, and lower educational expectations for their children (Hutchins et al., 2012; Rojewski, 1999; Rojewski & Kim, 2003).

For example, Hutchins and colleagues (2012), using data from the RHSA study, found that work-bound youth who did not plan to continue their education or were unsure about PSE perceived greater family economic hardship and lower parental educational expectations compared to college-bound youth. This finding held for work-bound youth who planned to work directly after high school, but also planned to continue their education. Rojewski (1999) also found that family economic hardship was the strongest predictor of work-bound status for rural youth. Interestingly, Bozick and DeLuca (2011) found that although some work-bound groups were more likely to experience economic hardship and have parents with lower levels of education, this was not true for those who had strong work orientations. Compared to youth enrolled in two-year programs, these work-driven youth came from families with similar economic backgrounds. However, these youth were less likely to have parents who earned a bachelor's degree, compared to two-year degree enrollees, suggesting that even when economic support is available work-driven youth may not enroll in PSE because of lack of family support.

Academic values and achievement. Work-bound youth, compared to college-bound youth, typically have more problematic schooling experiences, including lower levels of achievement, engagement, school valuing, and greater involvement in delinquent behavior (Deil-Amen & Turley, 2007; Finn & Zimmer, 2012; Juntunen & Wettersten, 2005; Staff et al., 2010). Often, problems in school begin before high school and represent a developmental process that unfolds over the course of one's time in school (Eccles & Roeser, 2009; Eccles et al., 2004). As youth reach high school, negative prior schooling experiences, as well as lack of family resources and support, may contribute to some youth developing stronger orientations to work over school. Youth who have stronger orientations to work and have experienced problems in school may disinvest from school and place their energies into other opportunities such as paid

work, particularly when these youth see education as less relevant for their futures (Staff et al., 2010). This is not to say that strong work orientations conflict with school as not all work-bound youth disengage from school (Blustein et al., 2002). However, youth who work long hours or work in low quality jobs are more likely to perform poorly in school, misbehave, and skip school (Mortimer, 2010; Staff et al., 2010).

Some work-bound youth feel that their interests and aspirations are not valued at school (Burnell, 2003; Krie & Rosenbaum, 2001; Mortimer et al., 2002; Rosenbaum et al., 2010). Results from qualitative studies of rural and nonrural youth discussed next suggest that work-bound youth who seek out school staff for advice are often disappointed because they perceive the information as less informative for their more work-oriented goals. Work in stage-environment fit theory (see Eccles et al., 1993) suggests that when the needs of the developing adolescent conflict with contextual affordances that negative outcomes, such as declines in academic motivation, can occur. Work-bound youth may experience such a mismatch in school because these youth have goals and aspirations that may conflict with the goals of school staff, which are typically around improving rigor and promoting college (Rosenbaum, 2001).

Schooling Experiences of Work-Bound Youth

In the previous section I discussed work-bound youth's academic achievement and valuing in general. Here I focus on schooling experiences that may be particularly salient for understanding how these youth prepare, or fail to prepare, for the STW transition through academic and career advising, career related coursework, and participation in career exploration as these activities represent important proximal processes that can promote career development.

Academic and career advising. School staff can nurture aspirations and provide specific guidance around college and careers (Griffin, Hutchins, & Meece, 2011; McDonough, 2005).

Some work-bound youth experience problems with school staff because they perceive these adults as less supportive or offering unhelpful advice (Burnell, 2003; Krie & Rosenbaum, 2001; Mortimer et al., 2002; Rosenbaum et al., 2010). This perceived lack of support may not be imagined. For example, Krei and Rosenbaum (2001) used interviews from counselors and vocational teachers at 12 Midwestern high schools to explore what advice they gave work-bound youth. They found that most counselors advised college to all without giving clear reasons why or they failed to connect labor market trends to specific PSE pathways. Counselors framed the choice as between going to a four-year college or getting a job. Few discussed technical education, apprenticeships, or job certificates. However, vocational teachers were more willing to discuss such opportunities and some were willing to help students find jobs. Unfortunately, many rural work-bound youth do not take vocational classes and thus miss out on such support (Hutchins et al., 2012; Rojewski, 1999).

Even high achieving work-bound students may perceive school personnel as less supportive. For example, Burnell (2003) interviewed 26 rural high school seniors across schools in New York who planned to work after school despite being prepared for college and found that despite their strong desire to work, most felt that PSE was important. However, most reported being told to go to college with little discussion of how specific PSE opportunities would meet their needs. Also, many expressed frustration because they felt that they were making rational and thoughtful decisions that were not being respected by school personnel. Research by Griffin and colleagues (2011), using the full RHSA dataset, found that less than half of the rural youth in this study talked to a teacher or school counselor about their futures. Though reasons were not explored and this study was not restricted to work-bound youth, these results indicate that some

rural youth, particularly work-bound youth, may not be reaching out to adults at school if these adults are perceived as less supportive and knowledgeable (Burnell, 2003; San Antonio, 2016).

Career curriculum. In recent years there has been concern around preparing youth for the rigors of PSE and improving job readiness skills; however, most of the effort has been focused on improving academic rigor (Rosenbaum et al., 2010; Symonds et al., 2011). Efforts to promote rigor may benefit college-bound youth, but it is not clear whether such efforts are equally beneficial for work-bound youth who are in greater need of immediately employable skills (Neumark & Rothstein, 2007). Although all youth may benefit from taking career and technical education (CTE) courses or programs[5] that are academically rigorous and promote career development, work-bound youth in particular may benefit by developing specific skills that can aid these youth as they enter the workforce (Stone, 2011).

Aliaga, Kotamraju, and Stone (2012), using data from the ELS:2002, found that most high school students took at least one CTE course. In fact, they found that 27% of students took three or more CTE credits and 17% took three or more CTE credits in a specific occupational area or sequence. Although encouraging, most studies have indicated that participation in formal CTE and/or vocational/technical education programs is low. For example, Stone and Aliaga (2007), using data from the National Longitudinal Survey of Youth (NLSY97), found that only 6.6% of youth reported themselves as CTE concentrators and only 5.9% reported dual enrollment in an academic and CTE concentration. These numbers are similar to other studies that generally find that participation in CTE oriented programs is less than 10% (Delci & Stern, 1999; Neumark, 2007; Rojewski & Kim, 2003).

[5] It should be noted that while there has been a rise in the number of programs designed to integrate school and work (e.g., career academies, joint technical preparation programs between high schools and community colleges, and early college high schools that specialize in career development) most high school students attend high schools that provide a limited number of curriculum programs (Perry & Wallace, 2012).

In general, low income youth, youth of color, low academically achieving students, and students whose parents have lower levels of education are all more likely to take part in career and/or vocationally oriented programs (Kelly & Price, 2009). Studies of rural work-bound youth have suggested that these youth are more likely to take part in more career and/or vocationally oriented courses compared to college-bound youth (Rojewski, 1999). However, one concerning finding is that most rural work-bound youth are less likely to take part in any specialized program, including college and vocational education (Hutchins et al., 2012).

For example, in a study of rural work-bound youth, Rojewski (1999), using data from the NELS:88, found that 46.7% of work-bound youth reported being in the general education track, 23.2% reported being in a vocational/technical track, and 19.1% reported being in the college track. It is not clear why fewer work-bound youth take part in such programs. It could be that some are unsure about their futures and do not want to commit to a specialized program. In terms of more career-oriented programs, it may be that there is a stigma associated with such programs given the strong four-year college focus (Halpern, 2012; Rosenbaum et al., 2010). Hutchins and colleagues (2012), using the RHSA dataset, found that less than 3% of the rural youth who planned to enter the workforce without continuing their education were enrolled in a college preparatory program. However, these authors did not explore vocational program participation. Recent work by Byun, Meece, and Agger (2017), using the RHSA dataset, suggested that enrollment in a college preparatory program more strongly predicted PSE enrollment patterns than aspirations. These studies suggest that most work-bound youth, regardless of geographic location, take part in the general curriculum which provides little STW transition preparation.

STW exploration programs. One way for youth to learn about work is to take part in formal programs that combine academic and work experiences such as internships, mentorships,

job shadowing, school-based enterprise, community service, and cooperative education (Neumark, 2007).[6] All youth may benefit from career exploration programs, but such opportunities may be particularly beneficial for work-bound youth. Unfortunately, few students in general take part in STW exploration programs and few student characteristics predict program participation (Joyce & Neumark, 2000; Stone & Aliaga, 2007). For example, Stone and Aliaga found that approximately 10% of students reported taking part in more structured activities such as job mentoring programs, whereas over 20% of students reported taking part in less structured activities such as job shadowing. Although STW exploration participation differs by the type of opportunity, participation across all programs is generally low.

One issue may be program availability. Hutchins and Akos (2013) conducted a study of rural-nonrural differences in STW program availability using data from the ELS:2002 administrator survey. They found that about half of schools provided job shadowing or community service (57% and 52%, respectively), but only about 25% offered internships, mentorships, cooperative education, and school-based enterprise. Rural schools were slightly less likely to offer exploration opportunities than nonrural schools, but most differences disappeared after controlling for school size and percent of students receiving free and/or reduced-price lunch. However, rural schools were more likely to offer vocational-technical programs than nonrural schools. Only 14-18% of 10th graders in this study took part in community service, job shadowing, or cooperative education, and only around 5% took part in internships, mentorships, and school-based enterprise. After controlling for program availability, the authors found that students in college and vocational tracks were more likely to take part in various exploration

[6] Other school sponsored activities such as sports, clubs, and other extracurricular activities can promote positive youth development (see Mahoney, Larson, Eccles, & Lord, 2005). However, here I focus on STW exploration programs because these programs are designed specifically for the purpose of promoting career development.

activities compared to those in the general track. Few meaningful differences were found based on rurality but, results must be interpreted with caution given the low overall participation rates.

In general, prior studies suggest that few youth take part in STW exploration activities. Availability may be a primary reason. Although STW exploration participation rates are low for all students, such findings are particularly problematic for work-bound youth because there is evidence to suggest that these programs are generally more effective for work-bound youth than college-bound youth (Neumark & Rothstein, 2007).

Limitations of Prior Research on Rural Work-Bound Youth

Four limitations in the literature on work-bound youth will be addressed in this study. These include: 1) limited studies that focus on the experiences of rural youth; 2) limited studies on rural work-bound youth; 3) the lack of research on interindividual differences among rural work-bound youth on perceived educational and occupational barriers; and 4) the lack of studies on interindividual differences among rural work-bound youth on schooling experiences, particularly on competency and value beliefs and on engagement in career exploration. I briefly discuss these limitations before discussing five specific research questions.

Lack of focus on rural youth. Approximately one-third of all schools in the U. S. are located in rural communities (Johnson, Showalter, Klein, & Lester, 2014; Johnson & Strange, 2007). From an ecological perspective, rural youth experience a developmental context that may be dissimilar to that of suburban and urban youth (Bronfenbrenner, 1979; Crockett et al., 2000). However, there is a lack of research devoted to understanding how the rural ecology, particularly rural schools, influences the transition experiences of rural youth and the research that is available has been characterized as being of low quality (Arnold, Newman, Gaddy, & Dean, 2005). Rural youth may experience opportunities and challenges which may not be addressed in

studies of nonrural youth, making it necessary to focus on this understudied population (Byun et al., 2012; Lichter & Johnson, 2007; Provasnik et al., 2007).

In terms of challenges, poverty tends to be more prevalent in rural communities and is typically long lasting, intergenerational, disproportionately focused on families of color, and more prevalent in remote areas (Provasnik et al., 2007). Rural youth face other challenges including geographic isolation, less access to effective teachers, less exposure to adult role models in professional or skilled occupations, less access to advanced and dual enrollment coursework, limited opportunities for career/college counseling and exploration, and limited job opportunities in the local community (Apostal & Bilden, 1991; Johnson & Strange, 2007; Monk, 2007; Petrin et al., 2014; Provasnik et al., 2007; Roscigno, Tomaskovic-Devey, & Crowley, 2006). Although economic hardship is not unique to rural youth, the added challenges associated with persistent poverty and more limited community and school resources can create a unique burden for rural youth (Elder & Conger, 2000; Hardré, 2007). Given these challenges, rural youth often face a conflict between staying in the community or leaving to pursue educational and employment opportunities in the transition to adulthood (Johnson, Elder, & Stern, 2005; Petrin, Farmer, Meece, & Byun, 2011; Petrin et al., 2014).

The rural context also provides opportunities that can promote positive youth development (Barley & Beesley, 2007; Roscigno et al., 2006). For example, rural youth may benefit from strong connections between parents, schools, and the community, as well as smaller schools that provide opportunity for student involvement (Burney & Cross, 2006; Crocket et al., 2000; Elder & Conger, 2000; Irvin, Farmer, Leung, Thompson, & Hutchins, 2010). These connections can be especially beneficial for rural youth who attend schools in high poverty areas (Irvin, Meece, Byun, Farmer, & Hutchins, 2011) as well as rural work-bound youth compared to

nonrural work-bound youth because such connections may translate into work opportunities (Mekos & Elder, 1996). An additional benefit of the rural community is the nature of work that many rural youth experience in adolescence. Shanahan, Elder, Burchinal, and Conger (1996) found that rural youth are more likely to work to help support the family than nonrural youth, and that this financial support can promote more positive relationships with parents. Obligations to the family may help rural work-bound youth foster a sense of commitment to the family, the community, and to adult responsibilities in general that may be beneficial in the STW transition.

Rural youth are attending college in greater numbers, but they are still more likely to be work bound compared to nonrural youth (Byun et al., 2012; Byun et al., 2015; Rojewski, 1999). Work-bound youth may experience challenges by not continuing their education, but some work-bound youth may experience opportunities that are unique to growing up and remaining in a rural community. Given the lack of research on work-bound youth in general, and the fact that rural youth are more likely to be work-bound compared to urban and suburban youth, there is a considerable need to better understand the experiences of rural work-bound youth.

There is also a need to recognize the considerable diversity across rural students, schools, and communities, which is often ignored in studies of rural youth (Coladarci, 2007; Irvin et al., 2011; Provasnik et al., 2007). For example, not all rural communities are characterized by poverty. The highest and most persistent forms of poverty tend to be concentrated in the Appalachia, Mississippi Delta, and southern Black Belt regions of the south (Johnson & Strange, 2007). In addition, rural schools differ in their proximity to urban areas, such that rural youth in closer proximity to larger population centers may have better access to resources, such as colleges and universities, which may improve transition outcomes (Turley, 2009).

Lack of focus on work-bound youth. A second limitation is that few studies focus on work-bound youth specifically, and the literature that is available is based primarily on studies that compare work-bound youth to college-bound youth (Juntunen & Wettersten, 2005). A problem with such an approach is the implicit assumption that PSE attainment is a goal of all youth, thus the goals, motivations, and achievements of college-bound youth become the standard against which work-bound youth are evaluated (Bozick & DeLuca, 2011). Work-bound youth are seen from a deficit perspective for having lower educational and occupational aspirations than college-bound youth, despite the fact that some work-bound youth may be purposeful in their decisions to forgo PSE and may have occupational aspirations and supports that make PSE less necessary (Blustein et al., 1997; Blustein et al., 2002; Bozick & DeLuca, 2011; Burnell, 2003). What is needed are studies that help differentiate work-bound youth who are purposeful and informed in their decision to forgo PSE from those who are less engaged in preparing for their futures and/or face contextual barriers that make PSE less attainable.[7]

Studies that take this approach are often limited by focusing on one or few dimensions when exploring interindividual differences. For example, Burnell (2003) and Hahn and Price (2008) have looked at academically qualified work-bound youth, but these authors did not compare these youth to non-academically qualified work-bound youth, making findings difficult to interpret.[8] Blustein and colleagues (2002) conducted a comparative study of work-bound youth from high vs. low SES backgrounds, finding that those from higher SES backgrounds reported more contextual supports (including from school personnel), more formalized career

[7] Some developmental investigators have called for more research that focuses on adolescents' decision making and exploration activities around the transition to adulthood over studies that focus on identifying adolescents with higher aspirations. For further reading please see Deitrick, Parker, and Salmela-Aro's (2012) work on *phase adequate engagement* or Schneider and Stevenson's (1999) work on *aligned ambitions*.

[8] It should be noted Hahn and Price (2008) did compare academically qualified work-bound youth to college-bound youth, finding that the former group tended to be less academically prepared for PSE.

goals, and higher job satisfaction after high school. Although such findings are informative, poverty is only one dimension that would be important to consider and because it is not a malleable factor, these findings present limited information for informing intervention efforts.

More research is needed that explores differences between work-bound youth across multiple developmental domains and how work-bound youth with similar patterns of experiences across domains (e.g., family, school, work, community, etc.) prepare for the transition to adulthood. For example, Bozick and DeLuca (2011) and Hutchins et al. (2012) have used person-oriented analysis to identify subgroups of work-bound youth across multiple domains. However, both studies suffer from limitations. A limitation of the Bozick and DeLuca (2011) study is that investigators removed approximately 40% of the work-bound youth from the identified clusters to improve cluster homogeneity, calling into question the generalizability of the results. The study by Hutchins and colleagues is informative because it is one of the few studies to use a sample of rural work-bound youth, but the authors used only two variables (educational and occupational expectations) to identify subgroups of work-bound youth. In addition, the identified groups were only compared to college-bound youth and not each other. A final limitation is that actual PSE outcome information was not available so that subgroups were identified based on PSE expectations. There have been two additional studies, but both studies provided limited information on interindividual differences because both studies only compared work-bound youth to college-bound youth (Rojewski, 1999; Rojewski & Kim, 2003).

Lack of research on interindividual differences among rural work-bound youth on *perceived* barriers. Many work-bound youth experience barriers that may limit employment and PSE opportunities (Juntunen & Wettersten, 2005). However, given the use of the bioecological model as a guiding framework for this study, a more interesting question is the degree to which

work-bound youth *perceive* barriers to their futures. Perceptions of opportunities and barriers in the STW transition can impact whether youth will formulate or pursue PSE aspirations (Lent et al., 1994; 2000). Unfortunately, what we know about the perceived educational and occupational opportunities and barriers among work-bound youth comes mostly from a few qualitative studies (Burnell, 2003; Blustein et al., 2002), or quantitative studies that have not considered rural work-bound youth specifically (Bozick & DeLuca, 2011).

Several investigators have commented on the lack of work around individual differences on perceived barriers among rural youth in general (Ali, McWhirter, & Chronister, 2005; McWhirter, Torres, Salgado, & Valdez, 2007). Although contextual barriers can influence educational and occupational development, it is the perception of those barriers that is important in determining whether youth will engage in activities that promote career development (Lent et al., 2000). For this reason, it is important to consider interindividual differences among work-bound youth on these perceived barriers. If certain groups of work-bound youth were found to perceive few educational and occupational barriers, this may provide evidence that not continuing or completing PSE may have been motivated by choice. Recently, Irvin and colleagues (2012) explored predictors of perceived barriers using the RHSA sample, but found few individual, family, and school factors predicted perceived educational barriers. However, these authors did not explore perceived barriers among groups of work-bound youth specifically.

Lack of research on interindividual differences among rural work-bound youth on schooling experience. Schools play an important role in shaping development (Eccles & Roeser, 2010; Meece & Schaefer, 2010). Lapan and colleagues have reported that rural high school students are more likely to experience more positive transitions to adulthood when they feel that they are supported both emotionally and instrumentally by school personnel in their career

decisions and when they take part in curriculum and exploration opportunities designed to improve career skills and knowledge (Lapan, Aoyagi, & Kayson, 2007; Lapan, Tucker, Kim, & Kosciulek, 2003). Meece and colleagues (2013), using data from the RHSA study, found that rural youth who reported more positive schooling experiences in general and around PSE preparation in particular, tended to have higher PSE aspirations as well as more aligned educational and occupational aspirations, which have been linked to better decision making and planning around the transition to adulthood (Schneider & Stevenson, 1999).[9]

It is well established that work-bound youth typically have more problematic schooling experiences compared to college-bound youth (Deil-Amen & Turley, 2007; Finn & Zimmer, 2012; Hamilton & Hamilton, 2006; Herr, 1995; Herr & Niles, 1997; Hutchins et al., 2012; Rojewski & Kim, 2003). However, there are two general problems in the literature that limit what we know about the schooling experiences of rural work-bound youth. First, considerably less is known about how subgroups of rural work-bound youth differ on schooling experiences because of previously mentioned limitations (Hutchins et al., 2012). For example, among four major studies of work-bound youth, three studies used college-bound youth as the reference group, making it difficult to draw conclusions about differences between work-bound groups (Hutchins et al., 2012; Rojewski, 1999; Rojewski & Kim, 2003).[10]

Second, the literature that is available on work-bound youth's schooling experiences has focused more on issues related to academic achievement and curricular program participation and less on students' competency and value beliefs around school (e.g., academic self-concept, school valuing, school belonging) (Hutchins et al., 2012). For example, Bozick and DeLuca (2011) only considered academic aptitude and school valuing in their study of interindividual

[9] These school findings held even after controlling for other individual, family, and community factors.

[10] Bozick & DeLuca's (2011) study is the exception.

differences among work-bound youth. Similarly, Rojewski and colleagues (Rojewski, 1999; Rojewski & Kim, 2003) explored schooling predictors of being work bound vs. college bound, but they only included curriculum program and vocational course participation in their models. The Hutchins et al. study is one of the few studies to focus on rural work-bound youth and to consider a number of perceived schooling experiences, but these authors only compared the identified subgroups of rural work-bound youth to college-bound youth and not each other. These authors found that all subgroups of work-bound youth evidenced poorer subjective evaluations of schooling experiences compared to college-bound youth.

Students' academic competency and value beliefs are important schooling experiences from an ecological perspective (Eccles & Roeser, 2010) and have been shown to be robust predictors of academic achievement, motivation, and future plans (Bandura et al., 2001). Understanding value beliefs, such as school belonging, may be particularly important as such beliefs have been shown to influence academic adjustment, particularly for youth who experience family hardship (Finn, 1989; Juvonen, 2006). Although this review includes information on work-bound youth's subjective competency and value beliefs around school, much of what we know comes from small qualitative studies (e.g., Burnell, 2003). More work is needed that uses larger samples of work-bound youth from diverse rural communities.

Guiding Research Questions

The purpose of this study was to address limitations in the literature by using cluster analysis to explore heterogeneity within a diverse sample of rural work-bound youth on perceived educational and occupational barriers as well as schooling experiences. I addressed these aims by answering five specific questions:

1. Do interpretable clusters of work-bound youth emerge when using students' perceived family hardship, educational aspirations, occupational aspirations, work orientations, and academic achievement?

A primary goal of this study was to identify distinct subgroups of work-bound youth using *force* and *resource* characteristics that the literature suggested may uncover theoretically meaningful groups. Perceived family hardship was used to assess resource availability. Family hardship is one of the strongest predictors of being work-bound, but it also has been found to differentiate subgroups of work-bound youth (Blustein et al., 2002; Bozick & DeLuca, 2011; Deil-Amen & Turley, 2007; Hutchins et al., 2012; Rojewski & Kim, 2003; Vuolo et al., 2014). Academic achievement[11], PSE aspirations, occupational aspirations, and work orientations were used to assess work-bound youth's force characteristics. Research has suggested that all are important indicators of whether someone will be work-bound in general (Deil-Amen & Turley, 2007; Hutchins et al., 2012; Rojewski & Kim, 2003; Vuolo et al., 2014). In addition, each factor has been found to differentiate work-bound students on schooling experiences and STW transition experiences (Blustein et al., 1997; 2002; Bozick & DeLuca, 2011; Burnell, 2013; Hutchins et al., 2012). Most importantly, no studies to date have explored differences between rural work-bound youth based on similar patterns of such resource and force characteristics.

No specific hypotheses were offered regarding what groups would emerge given the exploratory nature of this study. However, results from Bozick and DeLuca (2011), suggested a potential three-group solution at a minimum, potentially including a work-driven group, an economic-hardship group, and a multiple-hardship group (e.g., economic hardship, low academic

[11] Academic achievement can be conceptualized as a schooling experience. However, for this study academic achievement was used in the cluster analysis. The reason for this is that similar studies of work-bound youth include academic aptitude measures (e.g., Bozick & DeLuca, 2011; Rojewski, 1999; Rojewski & Kim, 2003). Because such a variable was not available in the RHSA dataset, academic achievement was used so that the current study would be more closely aligned with prior studies.

achievement, and low aspirations). However, due to different analytic approaches between the Bozick and DeLuca study and the present study, these groups were offered only as possible outcomes. The goal was to identify conceptually distinct and interpretable groups and report how these groups differ on the clustering variables. Particular attention was placed on identifying groups that broadened conceptualizations of work-bound youth found in the literature.

2. How do subgroups of work-bound youth differ on gender and ethnicity?

According to the bioecological model, demand characteristics of the individual can invite or discourage reaction from the social environment (Bronfenbrenner & Morris, 2006). Two important demand characteristics that can influence reactions from others are gender and race/ethnicity (Tudge et al., 2009). As such, I explored cluster differences related to the gender and racial composition of the groups. Because it was not clear what types of groups would emerge in the cluster analyses, no specific hypotheses were tested.

3. How do subgroups of work-bound youth differ in terms of the location of their schools within rural communities?

This study was descriptive in nature and not primarily concerned with addressing the role of community contextual factors. However, given the focus on rural youth it was important to recognize that rural communities are diverse and to incorporate this into the study design (Coladarci, 2007). As such, the groups were assessed in terms of school location of group members. School location was defined using urban-centric locale codes provided by the National Center on Education Statistics, which are based on a school's proximity to an urban area (discussed in detail later). No specific hypotheses were examined, but given that the locale codes are based on proximity to urban areas, it may be the case that if groups emerged that were

characterized by members with lower aspirations and greater perceived hardships, these youth may be more likely to come from more geographically remote areas (Haller & Virkler, 1993).

4. How do subgroups of work-bound youth differ on perceived hardships related to perceptions of local job opportunities, barriers to completing PSE, and barriers to occupational attainment?

Results from the cluster analysis may provide some indication as to why different groups did not continue their education or continued without attaining a degree. For example, if clusters emerged that were characterized by low aspirations, lower family hardship, stronger work orientations, and average or high academic achievement, this might suggest that these youth did not continue their education as a result of choice over perceived hardship. Although the RHSA dataset does not contain participants' self-reported reasons for not continuing or completing PSE, participants did complete a number of items in high school around perceived hardships that may indicate why different clusters did not attain PSE.

Once clusters were identified, perceived hardship and opportunity variables were used to evaluate whether cluster members perceive opportunities or hardships related to the transition. For example, clusters characterized by members reporting few perceived educational and occupational barriers and more positive perceptions of local job opportunities would suggest that for these youth, being work-bound may be the result of perceived opportunity over hardship. However, if clusters emerged where members reported multiple educational and occupational barriers and less positive perceptions of local job opportunities, this may indicate that, for these youth, being work-bound was related to perceived lack of opportunity and hardship.

5. How do subgroups of work-bound youth differ on their schooling experiences, including competency and value beliefs, participation in career counseling and exploration, and program of study participation?

Positive schooling experiences, particularly experiences that promote identity and career development, can be beneficial for work-bound youth and serve as a protective factor in the STW transition if these youth do not continue their education (Blustein et al., 2002; Neumark & Rothstein, 2007). Evaluating work-bound youth's schooling experiences may provide an indication as to which work-bound youth leave school better prepared for the transition. For example, work-bound youth who are more engaged in school, take part in career exploration, and seek career and college advice from school personnel may have more informed occupational goals and can use these experiences purposefully in the STW transition (Bowen et al., 2009).

To provide a general exploration of group differences on schooling experiences, two sets of variables were explored: 1) school competency and value beliefs which included school valuing, academic self-concept, and school belonging; and 2) participation in potentially career enhancing programs and services which included curriculum program participation (e.g., college, vocational, general program), participation in career counseling, and participation in career exploration (e.g., job shadowing, job mentoring). These variables may be particularly salient for youth who enter the work force after high school as participation in career enhancing programs and services may help these youth experience less floundering in the STW transition.

Specific hypotheses were not offered because subgroup characteristics were not known in advance. The literature reviewed suggests that work-bound youth in general may not feel supported if the school places less value on their goals and aspirations (Krei & Rosenbaum, 2001; Rosenbaum et al., 2010). If groups emerged that had strong work orientations and low

academic achievement and aspirations, these groups may exhibit lower school engagement across all schooling variables. However, if groups emerged that were high on both work orientation and academic achievement and aspirations, these youth may be more involved in career development activities and have overall higher levels of school engagement.

CHAPTER 3: METHODS

Data from the original Rural High School Aspirations (RHSA) study and follow up were used for this study. The RHSA study was designed to understand the educational, occupational, and residential aspirations of a national sample of rural high school youth. Data were collected from students, teachers, administrators, parents, and community members during the 2007-2008 academic year. In 2013, PSE enrollment data were collected on original RHSA participants using the National Student Clearinghouse (NSC). The NSC is a non-profit organization that tracks transcript records across 3,600 private and public colleges and universities, which enroll 98% of students in the U.S. NSC data were used to identify work-bound youth. Original study data were used for cluster analysis and analysis of perceived hardships and schooling experiences. The next sections provide details about the original study, the five year follow up, and the current study.

Sources of Data

Original RHSA Study

Study design and collection procedures. Students in grades 9 – 12 were recruited from 73 rural and small town high schools across 34 states. Sampling was based on a two-stage process where rural and small town schools were first identified from a list of over 100,000 public high schools using locale codes from the National Center for Education Statistics (NCES). In the second step, researchers placed emphasis on identifying schools receiving federal funding for the Rural Low Income Schools (RLIS) and Small Rural School Achievement Program (SRSA). Based on this stratified sampling, 114 schools were randomly selected and asked to

participate (73 agreed). As defined by the NCES locale system[12], eight participating schools (11.0%) were classified as small-town (locale codes 31, 32, and 33)[13], three (4.1%) as rural fringe (locale code 41), 19 (26.0%) as rural distant (locale code 42), and 43 (58.9%) as rural remote (locale code 43). Also, 19 schools were identified as RLIS and 22 were identified as SRSA. In 36 schools, 50% or more of students were eligible for free or reduced–price lunch and 15 schools had 50% or more students who identified as ethnic minority.

Attempts were made to sample all students at selected schools. As approved by the university Internal Review Board (IRB), the research team adhered to each district's recruitment and consenting procedures. In 36% of districts, parents provided active consent by signing consent forms. In 28% of districts, waiver procedures were used where consent forms were sent home to notify parents of the study. The remaining districts (34%) employed a combination of active and waiver consent procedures. No significant relations were found between consent procedures used, school poverty, or rates of student participation. Students completed assent forms indicating that participation was voluntary and could be withdrawn at any time. The student survey was paper and pencil and group administered by researchers in a common space on the school campus (e.g., cafeteria). One researcher read the instructions and questions aloud while others provided mobile monitoring. First-period teachers were asked to complete a brief survey on each participating student that included assessments of students' academic competence

[12] NCES identifies 12 urban-centric locales based on distance from urbanized areas (densely settled cores of census blocks with populations greater than 50,000). Towns are located within urban clusters (core areas with a population between 25,000 and 50,000) and rural locales are located outside of urban clusters ranging in distance from less than 2.5 miles (fringe), between 2.5 and 10 miles (distant), and greater than 10 miles (remote).

[13] This study included towns in part because the sample was originally identified under the metro-centric locale system that included towns in locale code categories that most considered rural (i.e., 6, 7, and 8). While collecting data the urban-centric locale codes were introduced. Study investigators began using the newer locale codes because they provided more descriptive and distinct categories of rural and town. Town schools were retained given the exploratory nature of the current study and because many rural researchers and organizations (e.g., Rural Community Trust) also include towns in their definitions of rural. Relations of cluster profiles to school location were examined as part of the study.

and teachers' PSE expectation, which were used in this study for cluster validation.[14] Teachers were paid a small sum to complete the survey and students received a small school supply.

Participants. The original sample included 8,754 students who agreed to participate out of 16,295 enrolled students, for a participation rate of 53.7%. In addition, 792 parents, 667 teachers, and 69 administrators took part in either a survey or structured interview. The original sample included 27.9% 9th graders, 27.3% 10th graders, 25.1% 11th graders, and 19.7% 12th graders. Also, 51.5% of participants were female students. In terms of race/ethnic background, the largest group self-reported as White (65.7%) followed by Hispanic or Latino/a (11.2%), multi-racial (9.6%), African American (7.1%), Native American or Alaska Native (3.7%), Asian (1.0%), Native Hawaiian/Pacific Islander (.3%), and other (1.3%).

RHSA Study Follow Up

Study design and collection procedures. In the summer of 2013, RHSA investigators obtained PSE outcome data from the NSC on a subset of original RHSA students by providing NSC with students' name and birth date information. The NSC matched these records to PSE records using a program called StudentTracker. StudentTracker contains information on over 3,600 colleges and universities, which enroll approximately 98% of all students in public and private postsecondary institutions in the U.S. PSE records included: community college enrollment, four-year college and university enrollment, college majors, and dates of enrollment.

Participants. Of the original 8,754 RHSA study participants, full name and birth date information necessary for a record search was available for 7,779 (88.9%) participants.[15] NSC's StudentTracker was able to locate PSE enrollment information for 4,805 of the 7,779 (61.8%)

[14] In cases where teachers did not know a student well, a counselor or administrator identified another teacher who knew the student well enough to complete the assessment.

[15] One large rural high school included in the original study did not allow RHSA investigators to collect any identifying information on students during survey administration per district policy.

requested records. Follow-up investigations suggest that those with matched records were proportionally more likely to be White and female and to have parents with higher levels of education (Byun et al., 2015). Appendix B provides a detailed summary of how original RHSA students with PSE enrollment records at follow up differed from students where no records were found. Results in Appendix B suggest that lack of PSE enrollment records for some students may be the result of these students not continuing their education beyond high school.[16]

Current Study

Study design and collection procedures. This study was a secondary data analysis using the original RHSA study and follow up data provided by the principal investigator (J. Meece). The analytic sample of work-bound youth was identified as students in 11th and 12th grade during the original study that never enrolled in a PSE institution, or enrolled, but did not complete a degree based on StudentTracker results (discussed next). Data collected from students during the original study was used for clustering and to assess students' perceived hardships and schooling experiences. Data collected from teachers was used for cluster validation.

Participants. Work-bound youth in the current study were defined as those who never enrolled in any postsecondary institution after high school, or enrolled, but did not have a record of completing any degree (from StudentTracker results). Original RHSA participants who were currently enrolled[17] were assumed to be on track for graduation and thus excluded from the analytic sample. Original RHSA participants who did not attain a degree and were not currently enrolled in a postsecondary institution were considered primarily work bound and included in the

[16] Further evidence for this suggestion comes from work by Hutchins, Meece, Farmer, and Irvin (2015) comparing the actual PSE enrollment pathways of work-bound and college-bound youth to the expected pathways reported by Hutchins et al. (2012), finding that 73% of the *college-bound* youth reported enrolling in PSE, 55% of the *work/college-bound* youth (i.e., planned to work first) enrolled, 21% of the *work-bound* youth (did not expect to continue), and 28% of the *work-bound/unsure* about college youth enrolled in PSE.

[17] Defined as being enrolled within one year of the StudentTracker search (August 1, 2012 to July 15, 2013).

analytic sample. The analytic sample was further restricted to students who were in 11th and 12th grade during the original RHSA study given that enrollment records were obtained only five years later.[18] Finally, participants who were unsure of their postsecondary educational or occupational aspirations were excluded (13%). Although educational and occupational indecision is an important area of study, it was beyond the scope of this study.[19]

Using these definitions, 1,714 youth from the original RHSA study and follow up were identified as work bound. Descriptive statistics for the analytic sample will be provided at the beginning of the next chapter prior to reporting study results. The reason for this is that some of these identified work-bound youth were excluded from analysis due to missing data or because they were identified as outliers for cluster analysis (both issues are discussed in detail in the data screening and preparation section).

Before proceeding, it is important to discuss limitations associated with StudentTracker results. Although the NSC provides one of the most comprehensive sources of information to private, state, federal, and research agencies on student postsecondary outcomes, results contain known sources of measurement error including incomplete institutional coverage, mismatched records, and student-requested blocks that prevent NSC from collecting data for some students. In the present context, these issues may have resulted in some students being misidentified as work bound when in fact they were degree recipients or currently enrolled in a postsecondary institution. Although a specific error rate cannot be provided for the current study, the reader is

[18] Recent cohorts of youth in general are either taking longer to enroll in college after high school or are enrolling, but not staying continuously enrolled, making it important to restrict the sample to those who had more time to establish enrollment patterns (Kerckhoff, 2002; Staff & Mortimer, 2007).

[19] This decision was in line with other RHSA studies (e.g., Byun et al., 2012; Irvin et al., 2012; Meece et al., 2015). Work by Staff, Harris, Sabates, and Briddell (2010) suggests that those with uncertain aspirations, particularly occupational aspirations, are at increased risk for a number of problematic transition outcomes. For this study, those with uncertain aspirations were compared to the final analytic sample on gender, race/ethnicity, and grade. Results indicated that the two groups did not differ on gender, race/ethnicity, but those with uncertain aspirations were statistically significantly more likely to be male youth (61% vs. 49%).

asked to refer to Appendix C for a detailed discussion of how the NSC obtains records, the sources of error, and the estimated impact of this error on studies that use the NSC data.

Measures

The primary instrument used in this study was a student survey that included scales and open-ended items on a variety of domains. Most of these scales have been used in other studies of rural youth and in national studies such as the Educational Longitudinal Study of 2002 and the National Educational Longitudinal Study of 1988. However, some scales were modified to assess factors unique to the rural context. Because these scales were adapted from original sources, the complete survey underwent an in-depth review. First, all items were reviewed by a panel of national experts, including those with expertise in rural education. Second, the survey was reviewed by senior research scientists at the U.S. Department of Education's Institute of Education Sciences. Finally, the survey was pilot-tested in a number of rural schools before it was used. Once survey data were collected, psychometric analysis was conducted to develop composite variables that were used in this study (see Byun, Walton, Meece, Irvin, & Hutchins, 2011).[20] Unless otherwise noted, the composite score for each scale was obtained by computing the mean rating across items. Higher scores indicate higher levels of the scale construct.

Cluster Analysis Variables

The following variables were selected to identify interindividual differences among rural work-bound youth based on a review of the literature that suggested that these variables were theoretically meaningful and had the potential to differentiate groups.

Postsecondary education aspirations. Students were asked "how far in school would you most like to go?" Options included: 1 = *less than high school graduation*; 2 = *high school*

[20] Reliability coefficients reported in this section are based on the current analytic sample. Other psychometric information (e.g., EFAs, CFAs) comes from the psychometric report and other publications by RHSA investigators unless otherwise noted (Byun et al., 2011).

graduation or GED only; 3 = *attend or complete a 2-year school course in a community college, vocational, or trade school*; 4 = *attend college, but not complete a 4-year degree*; 5 = *graduate from college*; 6 = *obtain a master's degree or equivalent*; 7 = *obtain a Ph.D., M.D., or other advanced degree*; and 8 = *don't know*. Responses were transformed into years of schooling (e.g., 1 = 11; 7 = 22) so that level of education could be treated as a continuous variable in analysis.

Occupational aspirations. Students were asked the open-ended question, "What kind of job or occupation would you most like to have at age 30?" Open-ended responses were coded by project staff into level of education typically required to perform the job using classifications provided by the Occupational Information Network (O*NET). O*NET is an online resource for occupational information that was developed by the U.S. Department of Labor/Employment and Training Administration. O*NET uses the Standard Occupational Classification (SOC) system to group jobs together based on similar duties, required skills, and levels of education. O*NET includes 965 occupations classified into 23 major occupational groups that represent the major occupational groupings used by many governmental agencies such as the U.S. Census Bureau, Department of Labor, and Department of Commerce (Stevens & Cho, 1985). Similar occupational categories have been used in a number of studies (e.g., National Educational Longitudinal Study:88, Educational Longitudinal Study:2002, and High School and Beyond:80).

Coders were trained on using the O*NET classification system and asked to practice coding a random sample of responses. Each response was coded by major and minor job category. When coders disagreed they discussed the response with a master coder. Once coders achieved 95% agreement, they were assigned random batches of open-ended responses for final coding. To ensure coding fidelity, 20% of all open-ended responses were randomly selected for double coding which yielded a mean coding agreement of 93%. Responses were classified

according to the level of education typically needed to perform the intended occupation. O*NET uses a classification system in which jobs are classified into one of five job zones. Typical education requirements for each of the five job zones is as follows: zone 1 – less than high school diploma/GED, zone 2 - high school diploma, zone 3 – some college (e.g., vocational training, associate's degree), zone 4 – bachelor's degree, and zone 5 – advanced/professional degree. Job zone values were transformed into the corresponding years of schooling so that occupational aspirations could be treated as a continuous variable in analysis.[21]

Work orientation. Students completed five items related to work orientation or values. These items were used as a proxy for desire to work.[22] These items were adapted from Greenhaus's (1971) work-salience/perceived importance of work and career scale. These items have been used in national studies including the ELS and NELS. These items were rated on a 6-point scale (1 = *not at all important* to 6 = *very important*) and included: "being successful in my line of work," "having lots of money," "being able to find steady work," "having a good job," and "being able to buy the things that I want (e.g., car, clothes, motorcycle, Ipod, boat, house, etc.)" An exploratory factor analysis (EFA)[23] indicated that these items formed two factors. The first factor contained the three job-related items and accounted for 45.6% of the variance. The second factor contained the two money-related items and accounted for 22.7% of the variance.

[21] For the current study, 2.0% of respondents indicated that they planned to be in the military at age 30. These responses were coded as job zone 2 unless the respondent offered specific information on the type of work he or she planned to perform in the military. Also, job zone 5 responses were reviewed by the study author to recode any occupations that would require an MD, PhD, or other advanced degree beyond a master's degree to more closely align the occupational aspirations variable to the educational aspiration variable.

[22] It was important to include a measure of work desire to differentiate work-bound youth who forgo PSE out of a desire to work and make money. Original study participants who did not plan to continue their education were asked about the degree to which not completing PSE was related to the desire to work. Because so few students (less than 10%) reported not planning to continue their education, very few students completed items related to desire to work.

[23] Conducted by the study author following procedures outlined by Byun and colleagues (2011).

The first factor was used in the current study as a measure of work orientation. Factor loadings were high and ranged from .78 to .81. Cronbach's alpha for the current study was .69.

Perceived family economic hardship. Students completed three items on a 5-point scale (1 = *never* to 5 = *all of the time*) assessing constraints felt relating to difficulty over paying bills and struggles with having enough money to buy items for the family. Items were adapted from multiple sources (i.e., Conger, Conger, Matthews, & Elder, 1999; Elder, Eccles, Ardelt, & Lord, 1995; Wadsworth & Compas, 2002). These items were similar to measures of financial hardship in antipoverty intervention research (Huston et al., 2001) and studies of rural families (e.g., Conger et al., 1999; Elder et al., 1995). An EFA conducted by study investigators indicated that these items formed a single factor which accounted for 81% of the variance. Confirmatory factor analysis (CFA) yielded a RMSEA of .50, indicating poor model fit. However, the NFI and CFI were both acceptable with values of 1 each. The standardized estimates for item loadings ranged from .81 to .91. Cronbach's alpha for the current study was .89.

Academic achievement. Students' academic achievement was assessed by asking students to indicate which "best describes your grades in school this year?" Response options ranged from 8 = *Mostly A's* to 1 = *Below D's.* This variable was treated as a continuous variable in the cluster analyses.

Cluster Evaluation and Validation Variables

The following variables were used to validate the clusters and explore demographic composition of the clusters. Cluster validity was assessed using teacher-reported PSE expectations and academic achievement. Support for the validity of the clusters would be established if teachers perceived interindividual differences among work-bound youth and that these perceptions related the patterns observed in the clusters. The composition of the clusters

were evaluated in terms of gender, race/ethnicity, and school location to better understand relations between the demographic and rural composition of the groups and their patterns of aspirations, work orientations, family hardship, and achievement.

Student demographic characteristics. Students were asked to complete gender and ethnicity questions near the end of the survey. For the ethnicity question, students were given a list and told that they could mark all that apply. The following race/ethnicity categories were used in the current analysis: White, African American, Hispanic or Latino/Latina, and Other. Due to small size of certain ethnicity categories, those students who reported ethnicity as Asian, American Indian or Alaskan Native, Native Hawaiian or other Pacific Islander, other, or those who selected more than one ethnicity were collapsed into the Other category. Gender and race/ethnicity were used descriptively to evaluate work-bound clusters.

School location. A student's school location was used to assign each student with a locale code for descriptive analysis. The following urban-centric locale code groups were used for analysis: *small town* (locale codes 31, 32, 33), *rural fringe/distant* (locale codes 41, 42), and *rural remote* (43). Rural fringe and distant were combined for analysis because so few students in the analytic sample attended schools located in rural fringe locales (1.9%).

Teacher-reported academic achievement and PSE expectations. Two RHSA measures were used to validate the cluster profiles. For these assessments, teachers were asked to complete a series of questions about participating students in their school including items about a student's academic achievement and how far the teacher expected a student to go in school. These measures were included in an independent teacher survey described earlier. For academic achievement, teachers were asked to indicate which "best describes this student's grades in school this year?" Response options ranged from 8 = *Mostly A's* to 1 = *Below D's*. This variable

was treated as a continuous for cluster validation. For PSE expectations, teachers were asked to indicate, "as things stand now, how far in school do you think this student will go?" Response options ranged from 1 = *Less than high school graduation* to 7 = *Obtain a Ph.D., M.D., or other advance degree*. Teachers who indicated "don't know" were excluded from analysis. Responses were transformed into years of schooling (e.g., 1 = *11*; 7 = *22*).

Perceived Hardship Variables

The following variables were used to assess cluster differences beyond what was uncovered by the clustering variables on perceived educational and occupational opportunities and barriers.

Perceptions of local job opportunities. Students completed seven items on a 6-point scale (1 = *strongly disagree* to 6 = *strongly agree*) assessing their views on local economic and employment conditions. These items were adapted from multiple sources (Conger et al., 1999; Elder et al., 1995) and included questions such as: "it is easy to get a good paying job around here," and "there have been a lot of business failures in our area." Results of an EFA by study investigators indicated that these items formed two factors which accounted for 34.3% and 26.2% of the variance. The first factor was positive perceptions of the local economy and job opportunities while the second factor was negative perceptions of the local economy and job opportunities. A follow up CFA yielded a RMSEA of .072 and CFI of .952, indicating that the two-factor model was an appropriate fit. The positive perceptions of the local economy and job opportunities factor was used in the current analysis. Cronbach's alpha for this factor was .68.

Educational barriers. Students were asked if they planned to continue their education beyond high school. Students who answered "yes" or "unsure" were asked to complete nine items on a 6-point scale (1 = *not at all* to 6 = *very much*) assessing how difficult a variety of

factors would make it for them to complete their education.[24] These reasons included financial (e.g., "needing to help support my family"), relational ("not wanting to leave my friends"), and preparation/motivation barriers (e.g., "my coursework did not adequately prepare me for my future education plans"). These items were adapted from work by McWhirter and colleagues (2000; 2007) who developed a 28-item scale of educational barriers. The number of items used in the RHSA study were substantially fewer than that used by McWhirter et al. and did not capture multiple dimensions of educational barriers (i.e., likelihood, magnitude). However, given the overall goal of assessing rural youth on a range of factors, the decision was made to include and adapt only as subset of the original items (Irvin et al., 2012). Results of an EFA revealed that the perceived barrier items formed a single factor that accounted for 48% of the variance. Factor loadings were high and ranged from .59 to .77. Cronbach's alpha for the current study was .86.

Occupational barriers. Students were asked to complete 11 items on a 6-point scale (1 = *not at all* to 6 = *very much*) assessing how difficult various factors would make it for them to get the job that they wanted by age 30. These items were also adapted from the 28-item scale developed by McWhirter et al. (2000; 2007). Many of the items in this scale overlapped with items in the educational barriers scale (e.g., "parents and friends not supporting my job/education plans"). However, these questions also included a question related to demographic barriers ("gender or racial discrimination"), job uncertainty (e.g., "not knowing what kind of job I really want") and job ability (e.g., "not having good skills for the job"). Results of an EFA[25] revealed that the perceived barrier items formed a single factor that accounted for 56% of the variance.

[24] Those who did not plan to continue their education (6%) were asked similarly worded items, but they were asked to answer the items in relation to how these factors influenced their decision not to complete their education.

[25] Conducted by the study author following procedures outlined by Byun and colleagues (2011).

Factor loadings were high and ranged from .56 to .85. Cronbach's alpha for the current study was .92.

Schooling Experience Variables

The following variables were selected to assess cluster differences on schooling experiences based on the theoretical position that work-bound youth with different dispositions, resources, and demographic characteristics may differentially experience schools in ways that would be informative for the literature on rural work-bound youth.

Career counseling and exploration. Students were asked 18 items using a 4-point scale (1 = *never*, 2 = *once or twice*, 3 = *3 to 5 times*, or 4 = *more than 5 times*) that assessed participation in career counseling or exploration. These questions have been used in a number of national surveys (e.g., NELS, 1988). An EFA indicated that these items formed two factors. The first factor, career counseling, consisted of five items: "How often have you talked about what you will do after high school with one of your teachers or another adult at school," "how often have your received instruction or counseling on how to find a job," "how often have you studied about different kinds of jobs and their requirements in class," "how often have you talked with a guidance counselor or other advisor about college," and "how often have you talked with a guidance counselor about possible jobs and careers." Item loadings ranged from .68 to .84. Cronbach's alpha for the current analysis was .81. The second factor, career exploration, consisted of five items: "How often have you taken part in cooperative education," "how often have you had an internship," "how often have you gone on job shadowing or work-site visits," "how often have you had job mentoring," and "how often have you taken part in school-based enterprise." Item loadings range from .66 to .81. Cronbach's alpha for the current study was .77.

Academic self-concept. Students were asked to rate how good they were in math, science, English/language arts, social studies, and other classes on a 7-point scale (1 = *not good at all* to 7 = *very good*) (Jodl, Michael, Malanchuk, Eccles, & Sameroff, 2001). These items were developed by Eccles and colleagues and have strong psychometric properties, including predictive validity (Eccles, 1993). An EFA conducted by study investigators demonstrated that these five items formed a single factor which accounted for 50% of the variance. A CFA yielded a RMSEA of .1, suggesting poor model fit. However, the NFI and CFI both indicated good model fit (i.e., .95 and .96, respectively). The standardized estimates of item loadings ranged from .60 to .75, except for the item "How good are you in mathematics?" which had a loading of .38. Nonetheless, all items were retained to form the scale. Cronbach's alpha for the current study was .68, which was lower than the .78 reported by Jodl et al. (2001).

School valuing. Twelve items on a 6-point scale (1 = *strongly disagree* to 6 = *strongly agree*) were included to assess students' value for school and whether they viewed it as a pathway for later opportunities. These items were adapted from measures created by Voelkl (1996), Lapan and colleagues (Lapan, Gysbers, & Petroski, 2001), and Jodl et al. (2001). Studies using these items have demonstrated that they predict academic achievement and classroom engagement (Finn & Frone, 2004; Voelkl, 1997). An EFA indicated that items formed two factors which accounted for 39% and 14% of the variance, respectively. The first factor was labeled positive school value as the five items that loaded on this factor referred to the positive value of school. These items included "school is one of the most important things in my life," "most of what I learn in school will be useful when I get a job," "school is more important than most people think," "the kind of education I'm getting here will help me later on," and "school is important to getting a good job." The second factor was labeled negative school value as these

five items referred to participants' negative views regarding the value of school. These items included "many of the things we learn in class are useless" and "school is often a waste of time." Two items loaded on a third component but did not form a reliable measure so were dropped. CFA results indicated that the two-factor model provided a good fit as the NFI and CFI were .95 and .96, respectively, and the RMSEA of .08 suggested acceptable fit. The current study used the positive school value latent factor in analyses; it accounted for a greater proportion of variance and yielded a higher internal consistency estimate. The standardized estimates of item loadings ranged from .65 to .85. Cronbach's alpha for the current study was .80.

School belonging. School belonging was assessed using an 11-item scale (Hagborg, 1994, 1998) derived from an initial measure developed by Goodenow (1993a, b). Specifically, Hagborg (1994, 1998) conducted factor analyses of the Goodenow (1993a, b) measure which showed that the items formed a single factor and deleted items with low factor loadings. The four week test-retest reliability of the 11-item version was .69 (Hagborg, 1998) and it strongly correlated (r = .95) with the original Goodenow scale (1993a, b). This measure assesses the extent of personal belonging, respect, and support that students feel in school. Participants indicated on a 5-point Likert scale (1 = *completely false* to 5 = *completely true*) how true the following types of statements were: "I feel a real part of my school," "I am included in lots of activities at my school," and "I am treated with as much respect as other students." An EFA demonstrated that these items formed a single factor which accounted for 52% of the variance. CFA modification indices indicated three items loaded on another item while one item cross-loaded on several items. As these three items interrelated in a meaningful fashion, one item was allowed to correlate with the corresponding item and the CFA was replicated after each modification. The item which cross-loaded with several other items was then deleted in the final

step. Each subsequent model improved fit and the final model fit was acceptable according to the NFI and CFI (i.e, .96 and .96, respectively) and the RMSEA (i.e., .07). The standardized estimates of item loadings ranged from .45 to .72. Cronbach's alpha among the final set of items for the current study was .91.

Data Preparation and Screening

Screening and descriptive statistics. I used SPSS 24.0 to generate descriptive statistics for study variables including means, standard deviations, skewness, and kurtosis to evaluate the distributional characteristics of the variables. Also, a correlation matrix was computed for clustering variables to determine if multicollinearity was present as this would require the use of appropriate distance measures for highly correlated variables. Although such screening is important, it is also important to note that most of the analytic techniques used in this study (e.g., cluster analysis and multinomial logistic regression) do not make distributional assumptions (Hair & Black, 1998; Pastor, 2010; Tabachnick & Fidell, 2007). Analysis of variance (ANOVA) does have distributional assumptions, but in large samples ANOVAs are robust to moderate deviations from normality (Tabachnick & Fidell, 2007).

Missing data. Missing data can reduce statistical power and introduce bias into the analysis (Enders, 2010; Tabachnick & Fidell, 2007). For this study, two methods were used to address missing data. Missing clustering variables were imputed using the IMPUTE program (discussed in greater detail in the analysis plan), which imputes missing values from values obtained from a nearest neighbor who is most similar to the case with missing data. This approach was used because it is consistent with the goals of cluster analysis.[26] All other variables

[26] Bergman and colleagues (2003) argue that the goal of person-oriented analysis is to identify unique patterns among variables within individuals, which is inconsistent with most regression-based imputation procedures that rely on correlations among variables at the population level to impute missing data for individuals (i.e., variable-

not included in the cluster analysis were imputed using the Multiple Imputation with Chained Equations (MICE) procedure in STATA 13 with the exception of gender and race/ethnicity. An advantage of multiple imputation over other imputation procedures (e.g., mean replacement) is that multiple datasets are imputed and pooled for statistical analysis to minimize the impact of any one poorly imputed dataset on analysis (Rubin, 2004). Given the importance of identifying causes of missing data, developing an appropriate imputation model, and evaluating the imputed datasets to identify potential sources of poor imputation results, a separate report was generated to fully explain the steps taken to impute the 50 datasets used for this analysis (see Appendix E).

Nested design of the data. Because students were nested within schools it was necessary to account for this in the analysis. Nesting violates the independence of observations assumption found in most analytic techniques. This can result in inflated standard errors which can lead to an increase in Type I errors in hypothesis testing (Raudenbush & Bryk, 2002). For this analysis, nesting was accounted for by generating robust standard errors using the *cluster* option within STATA which takes into account the violation of the independence of observations assumption. A number of investigations using the RHSA dataset have been conducted using robust standard errors to produce more parsimonious and interpretable results that account for nesting (e.g., Byun et al., 2012; Byun et al., 2017; Meece, Hutchins, Byun, Farmer, Irvin, & Weiss, 2013).

Analysis Plan

The analysis plan is organized around each research question outlined in Chapter 2. Given the particular importance of classifying reliable and valid clusters, considerable attention is spent addressing the first research question.

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oriented approach). As such, they suggest using the nearest neighbor approach to identify individuals with similar variable profiles to impute missing data as this is more consistent with the goals of person-oriented analysis.

Research question 1: Cluster analysis. Work-bound youth were cluster analyzed using *agglomerative hierarchical* and *k-means* clustering as part of a two-step procedure (Aldenderfer & Blashfield, 1984).[27] With hierarchical clustering, each individual starts as a single cluster and is then joined to other individuals or clusters of individuals until a single cluster is generated. The creation history of each cluster is retained so that multiple clusters solutions can be explored. Unfortunately, once clusters are formed, members cannot be reorganized to improve cluster fit. However, once a reasonable cluster solution has been established, k-means clustering can be used to move members between clusters to improve cluster fit. A disadvantage of k-means clustering is that it often results in poor results when no starting values are specified *a priori*. The advantage of this two-step clustering is that limitations inherent in both approaches are addressed when using the two approaches together (Aldenderfer & Blashfield, 1984; Pastor, 2010).

Analysis was conducted using SLEIPNER 2.1 (Bergman & El-Khouri, 2002), following guidelines outlined by Bergman and colleagues (2003). SLEIPNER is a collection of 18 programs designed for conducting person-oriented analysis. The IMPUTE, RESIDUE, CLUSTER, EVALUATE, RELOCATE, RANDOM, and CENTROID programs were used for data screening, cluster analysis, and evaluation of cluster solutions. The remainder of this discussion describes each of these steps in greater detail.

Data screening. Five variables were included based on suggestions that including more than eight variables can result in complex and difficult to interpret solutions (Bergman et al., 2003). Variables were standardized prior to analysis to account for different measurement scales

[27] A variety of person-oriented analytic methods are available to uncover interindividual differences. For example, Latent Class Analysis (LCA) is an approach that allows groups or "latent classes" of individual to be identified using a structural equation modeling approach and is growing in popularity within the social sciences. Although LCA provides a number of advantages over clustering techniques based on distance estimation (see Collins & Lanza, 2013), the decision was made to use cluster analysis in the current study given the wider use of distance-based clustering approaches within the field of education. Because this study was undertaken to primarily inform members of the education community, cluster analysis was used. However, future studies should replicate and extend findings from this study using a variety of person-oriented methods.

which can result in unequal influence on cluster results (Bergman et al.; Pastor, 2010). Missing data were addressed using the IMPUTE program, which evaluates cases with missing data by locating a nearest neighbor who has similar values on the non-missing values and then populates missing values with values obtained from the nearest neighbor.[28] Missing data were only imputed for cases with no more than two missing variables. The RESIDUE program[29] was used to identify outliers which can distort cluster solutions (Bergman et al., 2003).

Cluster analysis. The CLUSTER program was used for hierarchical clustering. The RELOCATE program was used for k-means clustering for cluster improvement.

Ward's (1963) clustering algorithm with squared Euclidean distance as the distance measure was selected for the CLUSTER procedure. The goal of this method is to minimize error variance created when clusters are fused, resulting in more homogenous clusters where members are more similar to each other and less similar to members of other clusters. Using this method, the means for all cluster variables are computed for each cluster. Then for each case within the cluster the squared Euclidean distance to the cluster means is calculated. The discrepancy between a case mean on a clustering variable to the cluster mean is calculated using sums of squares. These differences are summed for all cases on all variables within the cluster and across all clusters to generate an Error Sum of Square (ESS) for each cluster solution. Conceptually, ESS is a measure of the amount of error that results from adding individuals to clusters or fusing clusters. Ward's method operates by fusing clusters together that result in the smallest increase in ESS possible, thus creating more homogenous groups. Ward's method is particularly useful because it is one of the most robust clustering methods under a variety of conditions and has

[28] Using squared Euclidean distance to identify an individual whose distance is ≤ .5 standardized units from the individual with missing data. If a nearest neighbor was not found, values were not imputed.

[29] This procedure uses squared Euclidean distance (≤ .5) to evaluate the similarity of each case against all other cases in the sample. If a case could not be matched to at least one other case, this case was dropped.

been found to generate more accurate clusters in simulation studies where clusters are known (Milligan & Cooper, 1986).

My goal was to identify a solution that was parsimonious (i.e., fewest clusters necessary), but maintained as much homogeneity within cluster as possible. Given that there is no consensus for determining the final cluster solution, five criteria were used.

Manageable range of solutions. Only two to seven cluster solutions were considered.

Sharp increase in error variance. At each fusion of clusters, the ESS increases because as clusters are fused they become more dissimilar. Typically, ESS rises slowly initially and then rises sharply in final iterations as more dissimilar clusters are joined. I plotted the rise in ESS as a function of the number of clusters at each agglomerative step, interpreting the results similarly to a scree plot. A sharp rise in ESS would indicate that two highly dissimilar clusters were fused and that the solution observed prior to the sharp rise in ESS is optimal.

Inspection of cluster solution fit indices. The CLUSTER and EVALUATE programs produce various fit indices to help evaluate the quality of various cluster solutions. These include Explained Error Sums of Squares (E-ESS), C-index, G(+), Gamma, and the point biserial correlation. Particular attention was placed on the change in E-ESS at each iteration. E-ESS is generally interpreted as the proportion of variance among cluster variables that can be explained by the cluster solution at that step. E-ESS decreases as clusters fuse and become more dissimilar. Smaller values for the C-index and G(+) indicate optimal solutions whereas larger values for Gamma and the point biserial correlation indicate optimal solutions (Bergman et al., 2003).

Cluster size. Any solution that resulted in a cluster with less than 10% of the sample was not retained as small clusters present analytic challenges (Tabachnick & Fidell, 2007).

Comparison of clusters using clustering variables. Once a range of possible cluster solutions were identified, descriptive statistics and analysis of variance (ANOVA) were used to explore differences between clusters on clustering variables for each potential solution.[30]

Once a final cluster solution was selected, the RELOCATE program was used to improve cluster member homogeneity. RELOCATE uses cluster centroids from the CLUSTER program as seed values for cluster improvement. Results from the RELOCATE program were considered optimal and were thus given descriptive names and used for subsequent analysis.

Validation of final cluster solution. An important criticism of cluster analysis is that it can generate clusters when no structure truly exists in the data (Pastor, 2010). As such, additional steps were taken to evaluate the reliability and validity of the final cluster solution.

Reliability study. Replicability of clustering results is demonstrated when the final solution replicates across samples (Pastor, 2010). Unfortunately, a similar study does not exist to allow for such an analysis. In this situation, Bergman et al. (2003) recommend replicating the results by using a random sample containing half to two-thirds of the original sample and then comparing these results to the full sample results.[31] I used the RANDOM program to randomly select two-thirds of the cases from the full sample to submit to cluster analysis using the same decision process discussed previously. Results from the full and two-thirds sample were compared using the CENTROID program which pairs cluster solutions from each sample using squared Euclidean distance between cluster centroids. Pairs are matched in order of similarity such that the most similar pair appears first followed by the next closest pair. Cluster reliability

[30] Statistically significant *F*-tests were followed up with post hoc pairwise comparisons in order to evaluate the interpretability among the possible solutions using Tukey's HSD and controlling for familywise error rate. If homogeneity of variance assumption was violated, Dunnett's C test was used.

[31] Consistent findings between the full and random sample would suggest that clustering results were not an artifact of the data file structure. This procedure has been used in similar studies (e.g., Garrett & Eccles, 2009; Good, Willoughby, & Busseri, 2011; Zarrett et al., 2009).

was assessed by using an average squared Euclidean distance criterion of less than 1.0 standardized unit to evaluate pairs of clusters across both samples.

Validity study. To validate the final cluster solution, I used two teacher-reported measures: academic achievement and postsecondary expectations based on suggestions from the literature that validity evidence for cluster solutions can be demonstrated by showing that the identified clusters relate to external variables in a way that is expected based on theory, previous research, and/or logic (Pastor, 2010; Roeser & Peck, 2003). These particular variables were selected because they parallel two of the variables used in cluster analysis: students' self-reported grades and PSE aspirations.[32] ANOVAs were calculated to compare clusters on teacher-reported academic achievement and PSE expectations. Support for the validity of the final cluster solution would be evidenced by similar patterns of teacher-reported academic achievement and PSE expectations to those self-reported by students. One concern here is that teacher-reported grades and expectations for students may be influenced by demographic characteristics such as race/ethnicity and income as teachers have been found to hold more negative views of youth of color or low-income youth (Benner & Mistry, 2007; Tenenbaum & Ruck, 2007). Although this concern is noted, this was not taken into consideration analytically in the validity study.[33]

Research questions 2 and 3: Evaluation of work-bound subgroups in terms of gender, race/ethnicity, and school location (rural locale). These research questions were assessed by descriptively reporting the gender, race/ethnic composition of each work-bound

[32] Teachers were asked to report on their *expectations* for their students' PSE which is related to, but distinct from, a student's PSE *aspirations*.

[33] A series of bivariate correlations were conducted to understand the potential impact of this issue on the current study between the race/ethnicity groups used in analysis as well as between high and low perceived hardship students (using a *z* score dichotomy). Results for the correlation between student and teacher reported achievement is as follows: overall = .61; White = .63; African American = .62; Hispanic/Latino = .56; Other = .55; low hardship = .64; high hardship = .58. Results between student reported PSE aspirations and teacher reported expectations are as follows: overall = .34; White = .38; African American = .33; Hispanic/Latino = .34; Other = .20; low hardship = .38; high hardship = .29.

group, and school location of the members of each group, followed by contingency table analysis with chi-square tests and Fisher's exact t-test to evaluate whether the gender, race/ethnic composition, and location of the group members varied across groups. This analysis was conducted using SPSS.

Research questions 4 and 5: Differences between work-bound groups on perceived hardships and schooling experiences. Multinomial logistic regression models were estimated in STATA to explore differences between groups on perceived hardships and schooling experiences.[34] Multinomial logistic regression is an appropriate analytic strategy when the dependent variable is categorical with more than two groups, the independent variables are a combination of categorical and continuous, and the goal is to predict group membership based on the independent variables in the model (Tabachnick & Fidell, 2007). For this analysis the work-bound groups served as the dependent variable. Independent variables were entered into the model in three steps. First, gender, race/ethnicity, and school location were entered into the model as control variables. Second, perceived hardship variables were entered into the model to evaluate how groups differ on perceptions of job opportunities, and perceived educational and occupational barriers. In the final step, students' schooling experiences were entered to evaluate relations between cluster type and schooling experiences. By entering these variables in steps it was possible to evaluate the unique contribution of variables in each block.

Multinomial logistic regression uses maximum likelihood estimation to predict group membership based on the combination of independent variables. Overall model fit was assessed by interpreting loglikelihood statistics, pseudo (McFadden's) R^2, and the model's ability to accurately classify cases (Agresti, 2012; Long & Freese, 2006). Multinomial logistic regression requires that each group be compared to a reference group as simultaneous comparison is not

[34] Although questions 4 and 5 are distinct, they are discussed together as each will be addressed in the same model.

possible. Due to the exploratory nature of this study, no group served as the primary reference group. Instead models were estimated for each work-bound group so that all identified clusters served as a reference group, which allowed for all possible pairwise comparisons.[35] The contribution of each independent variable in predicting group status was assessed by requesting odds ratios for each independent variable in STATA. A statistically significant odds ratio indicates that as a given independent variable increases one unit, the odds increase (or decrease) that a participant is a member of the target group relative to the reference group. An additional benefit of interpreting the odds ratio is that the odds ratio provides information on the magnitude of the independent variable's relationship to group membership.

[35] Following an approach used by Bozick and DeLuca (2011) in their study of work-bound youth.

CHAPTER 4: RESULTS

Results are organized around the research questions. I begin by reporting descriptive statistics for the final analytic sample. Because different imputation procedures were used for cluster and regression analyses, imputations related to each analysis are discussed separately.

Characteristics of the Analytic Sample

The final analytic sample included 1,655 youth out of the 1,714 identified work-bound youth. Procedures for selecting participants were described earlier. In summary, I selected students in 11th or 12th grade during the original study, those who reported aspirations, and those who were identified as work-bound using StudentTracker data. Also, I excluded those who were missing more than two cluster variables or were identified as outliers.[36] This resulted in a final analytic sample of 1,655 work-bound youth. Table 1 provides descriptive statistics for the sample.[37] Approximately 51% of participants were girls. Approximately 45% were in 12th grade. The majority of participants were White (66.4%), followed by Hispanic or Latino (11.8%) and African American (6.8%). In addition, 15.0% of the sample was classified as "other" with those reporting more than one ethnic/racial group making up the majority of this group.

In terms of family background, approximately 59% of the sample reported that their parents had less than two years of PSE. Approximately 91% of the sample planned to continue

[36] Overall, 47 students were excluded for missing data (86% had complete data; 12% were missing only one cluster variable), one case was excluded because imputation failed to identify a nearest neighbor, and 11 were excluded because they were identified as outliers. Outliers tended to have lower occupational orientations compared to the other participants (M = 3.75 vs. 5.64).

[37] Table 1 also provides separate descriptive statistics for those work-bound youth who did not enroll in a PSE institution as well as those who did enroll, but did not attain a credential. Because the analysis involved combining both groups into one group, descriptive statistics discussed in the text are provided for the full sample.

their education at some point, but 43% did not plan to continue their education right away. Also, 42% aspired to attend or complete a four-year degree and 32% aspired to complete an advanced degree. Although PSE aspirations were high, teachers expected that only 31% of the sample would attain a four-year or advanced degree. However, it should be noted that students were asked to report their PSE *aspirations* whereas teachers were asked to report PSE *expectations*.

Table 1

Characteristics of the Analytic Sample (n = 1655)

Variable	Total Sample	Some PSE	No PSE
Gender			
Female	849 (51.3)	394 (55.1)	455 (48.5)
Grade			
12th	749 (45.3)	325 (45.5)	424 (45.1)
Ethnicity			
White	1090 (66.4)	484 (68.1)	606 (65.1)
African American	112 (6.8)	45 (6.3)	67 (7.2)
Hispanic/Latino(a)	193 (11.8)	76 (10.7)	117 (12.6)
Other	247 (15.0)	106 (14.9)	141 (15.1)
Parent/Guardians' Highest Level of Education			
HS or Less	586 (38.7)	250 (37.1)	336 (40.0)
Some PSE/No degree	303 (20.0)	150 (22.3)	153 (18.2)
Two-Year College	274 (18.1)	118 (17.5)	156 (18.5)
Four-Year College	211 (13.9)	97 (14.4)	114 (13.6)
Advanced Degree	140 (9.2)	58 (8.6)	82 (9.8)
Teacher-Reported Characteristics			
Receives Special Education Services	187 (12.2)	55 (7.7)	132 (14.0)
PSE Expectations for Student			
HS or Less	457 (29.9)	149 (23.0)	308 (34.9)
Attend or Complete Two-Year College	376 (24.6)	155 (23.9)	221 (25.1)
Attend or Complete Four-Year College	564 (36.9)	291 (44.9)	273 (31.0)
Advanced Degree	69 (4.5)	35 (5.4)	34 (3.8)
Don't Know	65 (4.2)	19 (2.9)	46 (5.2)
Student-Reported PSE Aspirations			
HS or Less	96 (5.8)	9 (1.3)	87 (9.3)
Attend or Complete Two-Year College	331 (20.2)	115 (16.3)	216 (23.1)
Attend or Complete Four-Year College	684 (41.8)	318 (45.1)	366 (39.2)
Advanced Degree	527 (32.2)	262 (37.2)	265 (28.4)
Student-Reported Postsecondary Expectations			
Plan to continue PSE	1492 (90.8)	689 (96.6)	803 (86.3)
Plan to work directly after high school	700 (43.0)	242 (34.1)	458 (49.8)

Research Question 1

The aim of research question 1 was to address whether reliable and valid clusters of rural work-bound youth could be identified using educational and occupational aspirations, occupational orientation, perceived family hardship, and academic achievement. Results of cluster analyses will be reported as follows: 1) data screening of variables; 2) results from initial hierarchical clustering to determine the number of clusters and seed values for k-means clustering; 3) results of the final cluster solution from the k-means clustering used to improve initial clusters; and 4) reliability and validity analysis of the final cluster solution.

Data screening of clustering variables. I screened all five clustering variables for normality (see Table 2) and multicollinearity (see Table 3).[38] Participants aspired to, on average, a four-year degree (M = 16.25 years of schooling; SD = 2.86) and to occupations where most workers had at least a two-year degree (M = 15.22 years; SD = 2.75). In terms of occupation orientation (i.e., having a "good," "stable" job), the sample average was high with little variation (M = 5.64 on a 6-point scale; SD = 0.51) whereas perceived family hardship was low (M = 1.86 on a 5-point scale; SD = 0.99). In terms of grades, students in the sample reported average grades of "mostly B's" (M = 6.12 on an 8-point scale; SD = 1.49).

To assess normality, I used Shapiro-Wilk's tests ($p > .05$) (Shapiro & Wilk, 1965; Razali & Wah, 2011), visual inspection of the histograms, and evaluation of skewness and kurtosis. Results of Shapiro-Wilk's test were statistically significant for all variables indicating a violation of the normality assumption. Inspection of the histograms and skewness and kurtosis statistics indicated that educational aspirations, occupational aspirations, and family hardship were all

[38] Although univariate normality is not required for cluster analysis, exploration of the clustering variables may inform interpretations of the clustering solutions. However, highly correlated variables can impact clustering, thus an examination of bivariate correlations was necessary.

positively skewed whereas occupational orientation and academic achievement were negatively skewed. Analysis revealed positive kurtosis for occupational aspirations, occupational orientation, and family hardship. Although all variables indicated departures from normality, occupational orientation evidenced extreme departure with most students holding high occupational orientations (M = 5.64 on a 6-point scale; SD = .51). Inspection of the bivariate correlations (Table 3) indicated that the highest bivariate correlation was .50 between educational and occupational aspirations, which is below guidelines for using distance measures that correct for highly correlated variables (Aldenderfer & Blashfield, 1984).

Table 2

Descriptive Statistics on Clustering Variables

	Range	Mean	(SD)	Skewness	Kurtosis	% Imputed
Education Aspirations	11 - 22	16.25	(2.86)	0.56	-0.25	1.0
Occupation Aspirations	11 - 22	15.22	(2.75)	0.95	0.64	9.3
Occupation Orientation	2.66 - 6.00	5.64	(0.51)	-1.82	4.03	0.1
Family Hardship	1.00 - 5.00	1.86	(0.99)	1.30	1.08	3.6
Academic Achievement	1.00 - 8.00	6.12	(1.49)	-0.57	-0.36	2.8

Note. Descriptive statistics represent full analytic sample (n = 1,655) with imputed values.

Table 3

Bivariate Correlations Among Clustering Variables

	1	2	3	4	5
1. Education Aspirations	1				
2. Occupation Aspirations	.501*	1			
3. Occupation Orientation	.168*	.075*	1		
4. Family Hardship	-.010	-.043	-.028	1	
5. Academic Achievement	.294*	.234*	.070*	-.021	1

Note: *Correlation is significant at $p < .01$ (2 tailed).

Hierarchical cluster analysis. For this analysis, I submitted the final analytic sample to the CLUSTER procedure using Ward's (1963) algorithm with squared Euclidean distance as the

distance measure to obtain an initial range of solutions. Potential cluster solutions were identified by examining changes in Error Sum of Squares (ESS) and Explained ESS (E-ESS) across the final 20 cluster solutions (see Figure 1). Inspection of Figure 1 suggested a steady increase in ESS with a noticeable rise between the 7- and 6-cluster solutions, followed by a sharp rise between the 6- and 5-cluster solutions. This sharp rise suggested that the 6- or possibly 7-cluster solution was most appropriate, but given the exploratory nature of this investigation, the 5-, 6-, and 7-cluster solutions were explored.

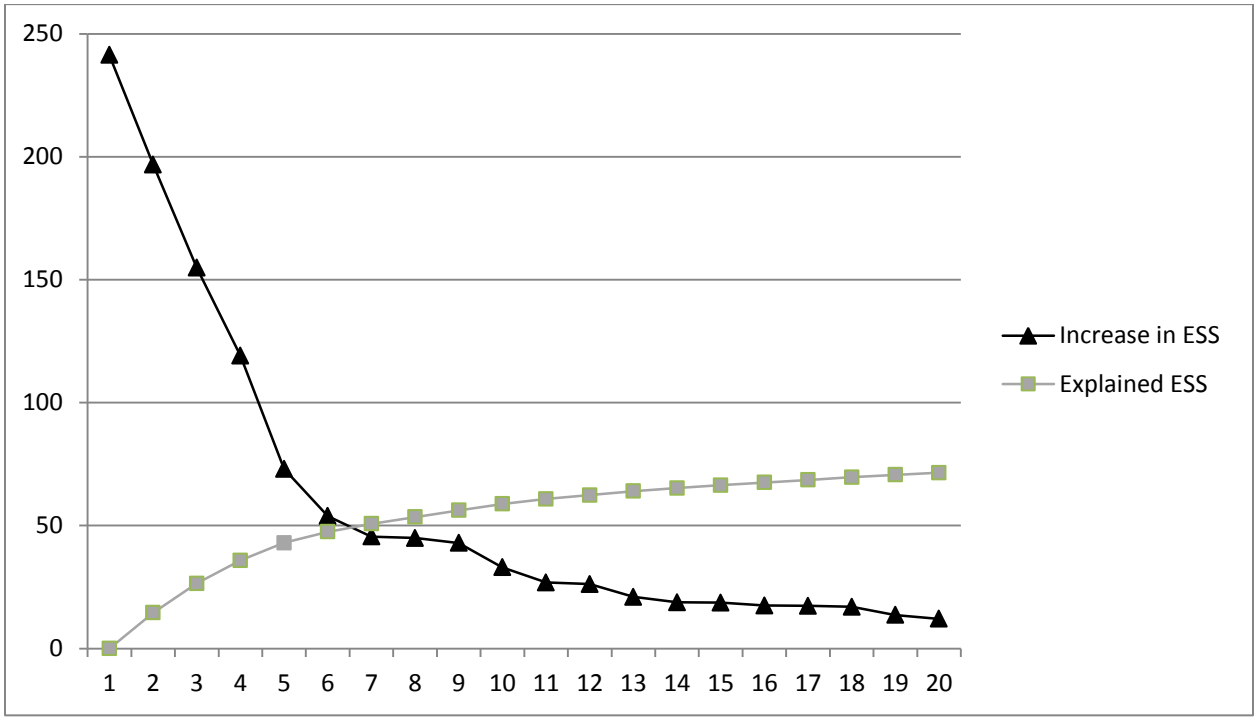

Figure 1. Error sum of squares (ESS) plot for work-bound youth clusters. X-axis indicates cluster solution and Y-axis indicates change in ESS value for ESS and percent of variance explained for E-ESS. For example, in terms of E-ESS, the 7-cluster solution explains approximately 50% of the variance among the five clustering variables.

Table 4 provides descriptive statistics across six cluster fit indices, including the fit indices reported in Figure 1. Point biserial correlation, C Index, Gamma, and the G+ Index are only reported for the three solutions under consideration for k-means clustering. Inspection of Table 4 suggested that a 5-, 6-, and 7-cluster solution would account for 43.05% to 50.73% of

the variance, respectively, according to Explained ESS. The C Index, Gamma, and G+ Index, suggested that a 7-cluster solution was optimal whereas the point biserial correlation suggested that the 6-cluster solution was optimal.

Table 4

Descriptive Statistics on Cluster Fit Indices

Number of Clusters	Increase in Error Sum of Squares	Explained Error Sum of Squares	Point Biserial	C Index	Gamma	G+ Index
10	33.08	58.80				
9	42.95	56.20				
8	44.97	53.48				
7	45.54	50.73	0.327	**0.118**	**0.585**	**0.062**
6	53.89	47.47	**0.332**	0.122	0.567	0.069
5	73.07	43.05	0.318	0.126	0.514	0.084
4	119.04	35.85				
3	154.92	26.49				
2	196.79	14.59				
1	241.35	0				

Note. Highlighted fit indices represent optimal cluster solution fit.

Given these results, I evaluated the 5-, 6-, and 7-cluster solutions further by exploring how each solution differed on the clustering variables. Following recommendations from Bergman et al. (2003), clusters were referred to by number here to avoid misunderstanding due to imprecise labeling. Once I submitted the selected solution to k-means clustering for cluster improvement, I assigned names to clusters based on my evaluation of the final results.

Seven-cluster solution. Table 5 and Figure 2 provide descriptive summaries for the 7-cluster solution. *Cluster 1* (7.7%) was characterized by members with high[39] educational and occupational aspirations. *Cluster 2* (8.3%) was characterized by members who were high on

[39] For consistency in cluster evaluation, the terms *high* and *low* are generally used to describe differences between each cluster and the overall sample when z-scores on a given clustering variable was +/- .5 *SD* for the cluster relative to the overall sample (i.e., high and low should not be interpreted in absolute terms). Evaluations of the clusters in absolute terms will be made on the final k-means clustering solution.

perceived family hardship, and low on academic achievement and educational and occupational aspirations. *Cluster 3* (14.4%) was also high on perceived family hardship, but members reported high educational aspirations, average occupational aspirations, and above average achievement. *Cluster 4* (5.9%) was characterized by high educational aspirations and slightly below average perceived family hardship. *Cluster 5* (20.4%) was characterized by members who were slightly below average on educational aspirations, below average on occupational orientations and had average grades. *Cluster 6* (29.7%) was characterized by members who had slightly below average educational and occupational aspirations, slightly above average occupational orientations, slightly below average hardship, and were low on academic achievement. *Cluster 7* (13.6%) was characterized by work-bound youth who had educational and occupational aspirations near the average, were high on occupational orientations and academic achievement, and low on hardship.

Six-cluster solution. Table 6 and Figure 3 provide descriptive summaries for the 6-cluster solution. The 6-cluster solution resulted from a fusion of *Clusters 4* and *7* from the 7-cluster solution to produce a cluster that represented 19.5% of the overall sample. This fusion resulted in a cluster (*Cluster 4*, Table 6) that was characterized by work-bound youth who were high on educational aspirations and academic achievement, above average on occupational orientation, and low on perceived hardship.

Five-cluster solution. Table 7 and Figure 4 provide descriptive summaries for the 5-cluster solution. The 5-cluster solution resulted from a fusion of the two clusters characterized by the highest perceived family hardship (*Clusters 2* and *3* in the 6-cluster solution). This fusion resulted in a cluster (*Cluster 2*, Table 7) that was characterized by high perceived hardship and means that were similar to the overall sample average across all other clustering variables.

Table 5

Means and Standard Deviations for Preliminary Seven Cluster Solution

Variable	Sample	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
N (%)	1655 (100%)	127 (7.7%)	137 (8.3%)	238 (14.4%)	98 (5.9%)	338 (20.4%)	492 (29.7%)	225 (13.6%)
Homogeneity Coefficient	2.00	1.06	1.22	1.15	0.90	1.34	0.87	0.39
1. Educational Aspirations	16.25 (2.86)	19.33^{a} (2.99)	14.17^{b} (2.20)	17.48^{c} (2.47)	22.00^{d} (0.00)	14.92^{be} (1.97)	14.96^{e} (1.94)	16.78^{f} (1.00)
2. Occupational Aspirations	15.22 (2.75)	22.00^{a} (0.00)	13.60^{b} (1.56)	15.46^{c} (2.20)	15.73^{c} (2.02)	14.65^{de} (1.96)	14.25^{d} (1.82)	14.91^{ce} (1.97)
3. Occupational Orientation	5.64 (0.51)	5.77^{ab} (0.34)	5.65^{a} (0.43)	5.77^{a} (0.30)	5.76^{ac} (0.43)	4.92^{d} (0.54)	5.87^{bc} (0.22)	5.92^{c} (0.15)
4. Family Hardship	1.86 (0.99)	1.51^{ab} (0.63)	3.30^{c} (0.80)	3.26^{c} (0.92)	1.44^{ab} (0.53)	1.60^{a} (0.60)	1.46^{b} (0.51)	1.18^{d} (0.26)
5. Academic Achievement	6.12 (1.49)	6.62^{a} (1.25)	4.79^{b} (1.31)	7.07^{c} (0.84)	6.51^{ad} (1.27)	6.12^{d} (1.39)	5.23^{b} (1.34)	7.40^{e} (0.65)

Note: All ANOVAs are significant at $p < .001$ (1. $F(6, 1648) = 285.43$, $\eta^2 = .51$; 2. $F(6, 1648) = 331.05$, $\eta^2 = .55$; 3. $F(6, 1648) = 304.00$, $\eta^2 = .53$; 4. $F(6, 1648) = 429.52$, $\eta^2 = .61$; 5. $F(6, 1648) = 144.64$, $\eta^2 = .34$). Group means in each row that share a superscript do not statistically significantly differ (at $p \leq .01$ level). For example, in terms of educational aspirations, Cluster 1 differs from all other clusters because Cluster 1 does not share the superscript "a" with any other clusters. However, Cluster 2 does not differ from Cluster 5 because these clusters share the superscript "b." The Homogeneity Coefficient (HC) is a measure of the Average Squared Euclidean Distance (ASED) between each pair of participants. For standardized data, HC = 2 for the entire sample. In a satisfactory solution HC should be considerably below 2 in each cluster with HC $\leq$ 1.0 often considered acceptable. HC = 1 can be interpreted as the ASED between each cluster member and cluster centroid (the profile of means) is = 0.25 standardized units.

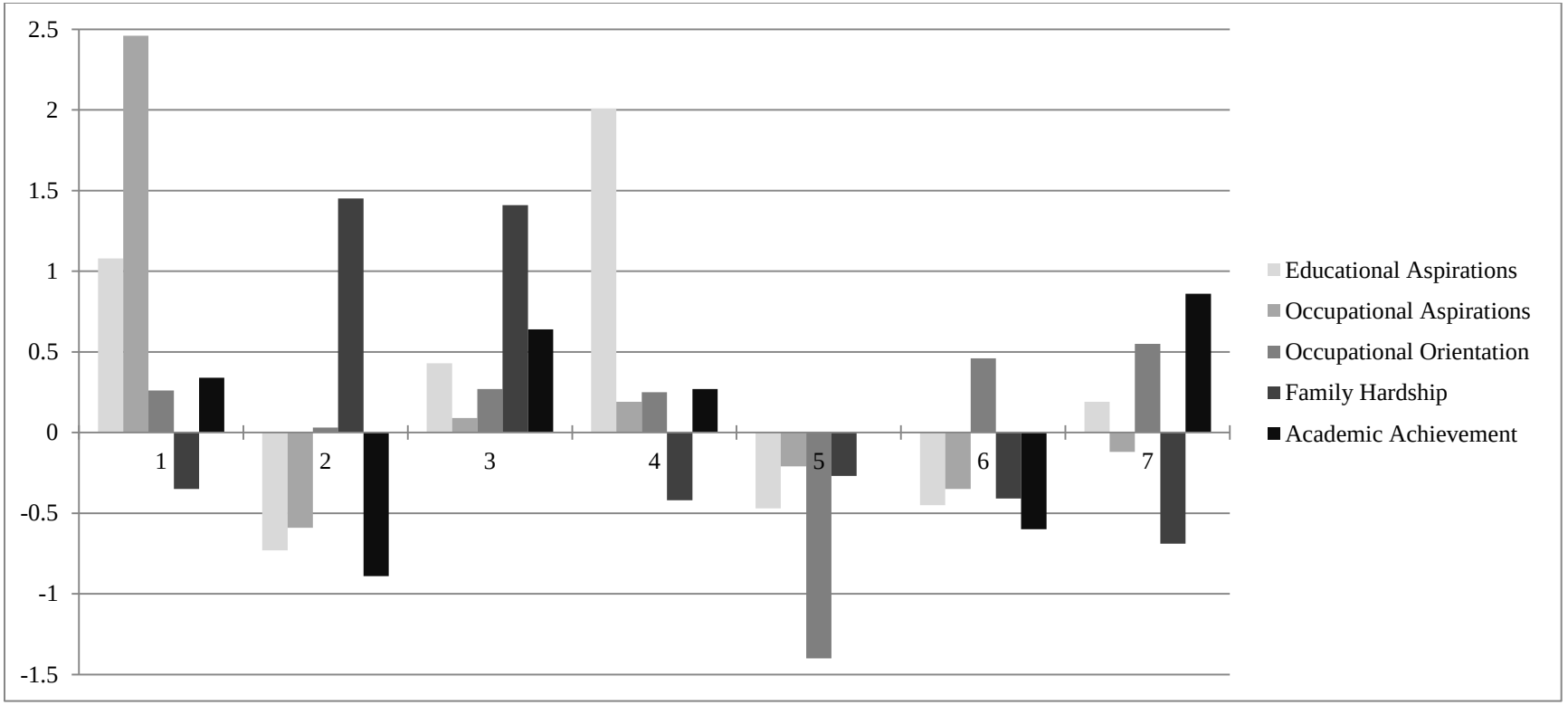

Figure 2. Seven cluster solution standardized scores on clustering variables.

Table 6

Means and Standard Deviations for Preliminary Six Cluster Solution

Variable	Sample	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
N (%)	1655 (100%)	127 (7.7%)	137 (8.3%)	238 (14.4%)	323 (19.5%)	338 (20.4%)	492 (29.7%)
Homogeneity Coefficient	2.00	1.06	1.22	1.15	0.87	1.34	0.87
1. Educational Aspirations	16.25 (2.86)	19.33^{a} (2.99)	14.17^{b} (2.20)	17.48^{c} (2.47)	18.37^{a} (2.54)	14.92^{e} (1.97)	14.96^{e} (1.94)
2. Occupational Aspirations	15.22 (2.75)	22.00^{a} (0.00)	13.60^{b} (1.56)	15.46^{c} (2.20)	15.16^{cd} (2.02)	14.65^{de} (1.96)	14.25^{e} (1.82)
3. Occupational Orientation	5.64 (0.51)	5.77^{ab} (0.34)	5.65^{b} (0.43)	5.77^{b} (0.30)	5.87^{a} (0.28)	4.92^{c} (0.54)	5.87^{a} (0.22)
4. Family Hardship	1.86 (0.99)	1.51^{ade} (0.63)	3.30^{b} (0.80)	3.26^{b} (0.92)	1.26^{c} (0.38)	1.60^{d} (0.60)	1.46^{e} (0.51)
5. Academic Achievement	6.12 (1.49)	6.62^{a} (1.25)	4.79^{b} (1.31)	7.07^{c} (0.84)	7.13^{c} (0.97)	6.12^{d} (1.39)	5.23^{e} (1.34)

Note: All ANOVAs are significant at $p < .001$ (1. $F(5, 1649) = 195.27$, $\eta^2 = .37$; 2. $F(5, 1649) = 391.54$, $\eta^2 = .54$; 3. $F(5, 1649) = 359.48$, $\eta^2 = .52$; 4. $F(5, 1649) = 509.46$, $\eta^2 = .61$; 5. $F(5, 1649) = 162.60$, $\eta^2 = .33$). Group means in each row that share a superscript do not statistically significantly differ at $p \leq .01$ level.

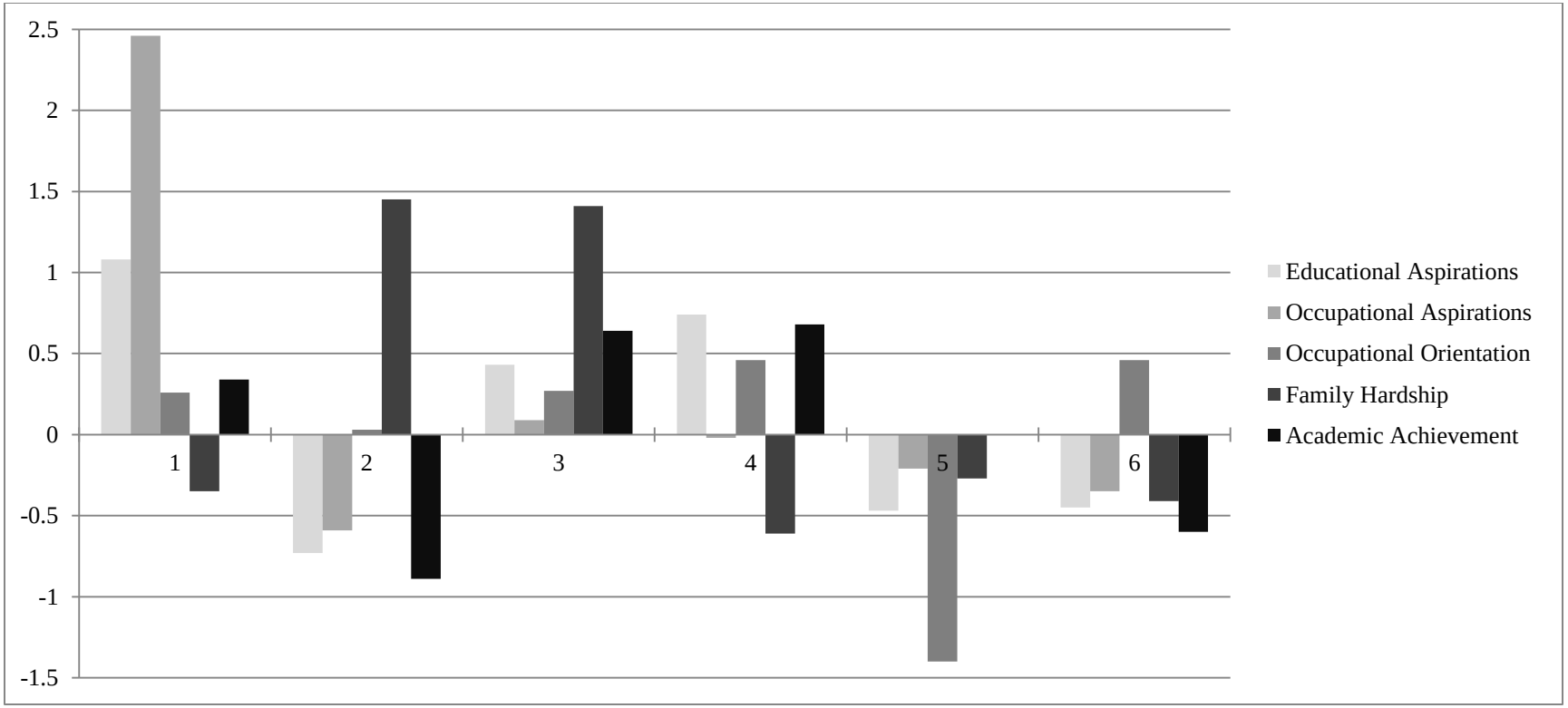

Figure 3. Six cluster solution standardized scores on clustering variables.

.

Table 7

Means and Standard Deviations for Preliminary Five Cluster Solution

Variable	Sample	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
N (%)	1655 (100%)	127 (7.7%)	375 (22.7%)	323 (19.5%)	338 (20.4%)	492 (29.7%)
Homogeneity Coefficient	2.00	1.06	1.57	0.87	1.34	0.87
1. Educational Aspirations	16.25 (2.86)	19.33^{a} (2.99)	16.27^{b} (2.86)	18.37^{a} (2.54)	14.92^{c} (1.97)	14.96^{c} (1.94)
2. Occupational Aspirations	15.22 (2.75)	22.00^{a} (0.00)	14.78^{bc} (2.18)	15.16^{b} (2.02)	14.65^{cd} (1.96)	14.25^{d} (1.82)
3. Occupational Orientation	5.64 (0.51)	5.77^{ab} (0.34)	5.72^{b} (0.36)	5.87^{a} (0.28)	4.92^{c} (0.54)	5.87^{a} (0.22)
4. Family Hardship	1.86 (0.99)	1.51^{a} (0.63)	3.27^{b} (0.88)	1.26^{c} (0.38)	1.60^{a} (0.60)	1.46^{a} (0.51)
5. Academic Achievement	6.12 (1.49)	6.62^{a} (1.25)	6.23^{ab} (1.51)	7.13^{c} (0.97)	6.12^{b} (1.39)	5.23^{d} (1.34)

Note: All ANOVAs are significant at $p < .001$ (1. $F(4, 1650) = 177.85$, $\eta^2 = .30$; 2. $F(4, 1650) = 444.64$, $\eta^2 = .52$; 3. $F(4, 1650) = 444.17$, $\eta^2 = .52$; 4. $F(4, 1650) = 636.97$, $\eta^2 = .61$; 5. $F(4, 1650) = 107.77$, $\eta^2 = .21$). Group means in each row that share a superscript do not statistically significantly differ at $p \leq .01$ level.

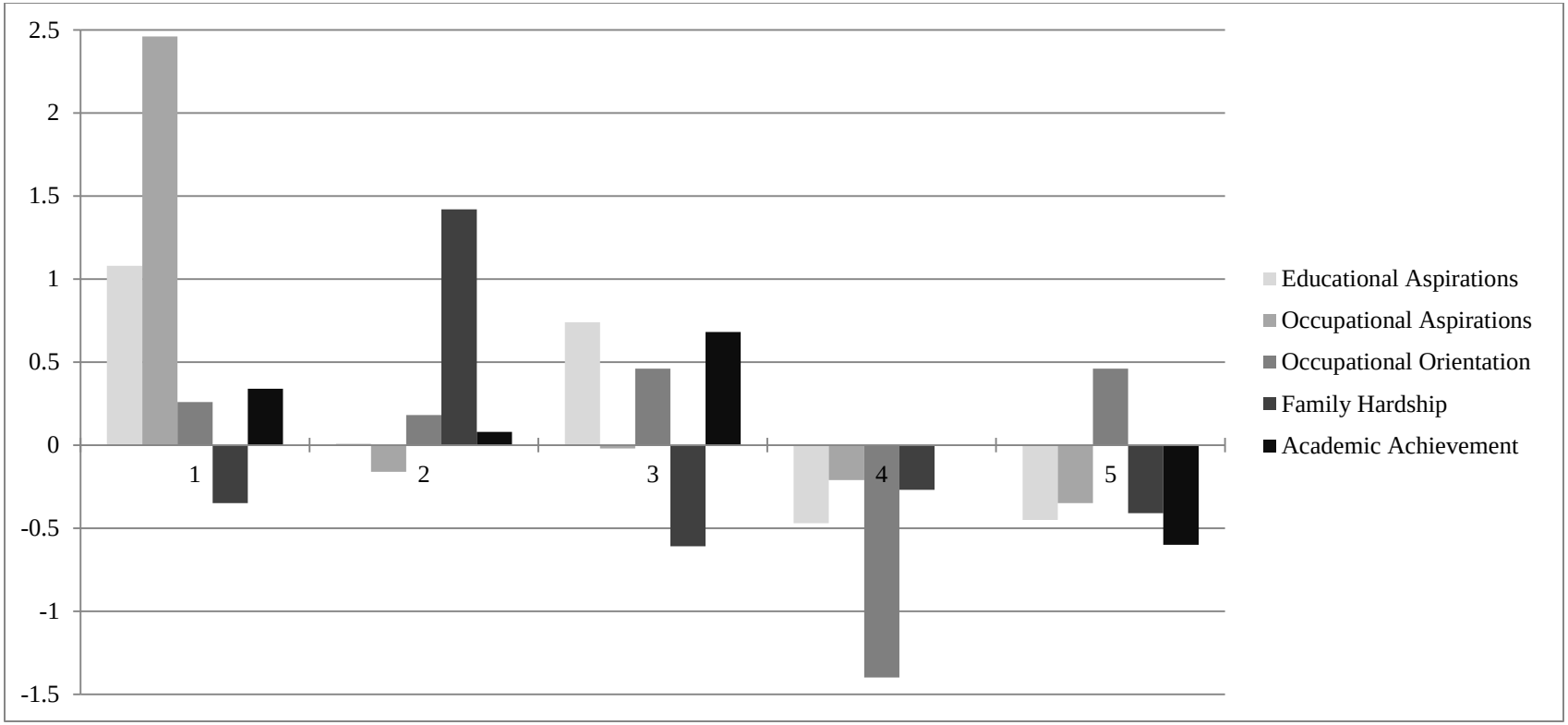

Figure 4. Five cluster solution standardized scores on clustering variables.

Selection of cluster solution. Inspection of clustering indices and cluster means on the five clustering variables suggested the 6-cluster solution was most parsimonious. The sharp rise in error variance from the 6- to 5-cluster solution (Figure 1) suggested a fusion of dissimilar clusters. This interpretation was supported by other fit indices suggesting a 6- or 7-cluster solution. Also, the 5-cluster solution resulted from the fusion of clusters that shared high perceived hardship, but differed on patterns of aspirations and academic achievement. One group evidenced high hardship with high achievement and aspirations, whereas the other evidenced high hardship with low aspirations and achievement. The fusion of these two dissimilar clusters would be of little theoretical interest. Retaining both clusters would result in the potential to uncover meaningful differences between higher and lower aspiring groups who shared similar levels of higher hardship, which would be of interest to investigators of work-bound youth.

The decision to reject the 7-cluster solution was driven by the goal to maximize the identification of diverse clusters while providing results that were parsimonious and manageable for subsequent analysis. Although moving from the 7- to 6-cluster solution resulted in the fusion of two clusters that differed somewhat on levels of aspirations and achievement (see *Clusters 4* and *7* in Table 5), both clusters shared similar patterns of above average occupational orientations and below average levels of family hardship. Although *Cluster 4* members had higher aspirations and lower achievement compared to *Cluster 7* in the 7- cluster solution, both clusters were above the sample average in terms of aspirations and achievement. The fusion of these clusters resulted in a minimal loss of information (3.26% explained variance) and a new cluster with acceptable homogeneity. A final consideration leading to the rejection of the 7-cluster solution was the fact that one cluster was comprised of only 5.9% of the sample which would create challenges for subsequent analysis.

K-means (final) cluster relocation analysis. I submitted results from the 6-cluster hierarchical clustering to k-means clustering using the RELOCATE program to relocate prematurely classified members to new and better fitting clusters to produce more homogenous clusters and improve overall explained variance (Explained ESS) of the clustering solution. K-means clustering uses cluster centroid values from the hierarchical clustering as seed, or starting values. Using the RELOCATE program, 537 members (32.4%) were relocated to different clusters, resulting in an increase in explained variance in the final cluster solution from 47.47% to 54.07% (6.6% gain) and improved cluster homogeneity for five of the six clusters. Please see Tables 6 and 8 to compare hierarchical clustering results to k-means (final) clustering results.

Description of final cluster solution. Table 8 provides descriptive statistics for the final cluster solution. *Cluster 1* (*n* = 243; 14.7%) was comprised of members who had the highest educational and occupational aspirations of all clusters. This cluster was characterized by lower perceived family hardship and higher self-reported academic achievement relative to most other clusters. This group was assigned the label *Ambitious* work-bound youth.[40]

Cluster 2 (*n* = 175; 10.6%) included members who reported high levels of family hardship relative to five of the six clusters. Also, this cluster was characterized by members who had high educational and occupational aspirations and academic achievement relative to most other groups. This group was assigned the label *Persistent* work-bound youth.

Cluster 3 (*n* = 515; 31.1%) was the largest cluster and included youth who aspired to 16.35 years of schooling, on average, (corresponding to approximately a four-year degree) which was below the aspirations of *ambitious* and *persistent* youth. This group also had higher occupational orientations and academic achievement than most groups as well as low perceived family hardship. This group was assigned the label *Well Rounded* work-bound youth.

[40] Such labels are for ease of interpretation and may not adequately characterize the cluster or all cluster members.

Cluster 4 (*n* = 191; 11.5%) included youth who reported the lowest occupational orientation relative to all other clusters. However, the cluster mean of 4.60 on a 6-point scale suggested that members of this cluster had positive work orientations overall. Also, cluster members generally had slightly lower educational and occupational aspirations and academic achievement compared to the *ambitious*, *persistent*, and *well-rounded* youth. However, this group aspired to 14.89 years of schooling, on average, which was between a two- and four-year degree. This group was assigned the label *Average* work-bound youth.

Cluster 5 (*n* = 157; 9.5%) included youth who had equally high perceived family hardship as the *persistent* group. However, unlike *persistent* youth, cluster members reported low educational and occupational aspirations and academic achievement relative to most other clusters. This group was assigned the label *Multiple Disadvantage* work-bound youth.

Finally, *Cluster 6* (*n* = 374; 22.6%) included members who were similar to *average* and *multiple-disadvantage* clusters in that this group had lower educational and occupational aspirations. However, this group was similar to *ambitious*, *persistent*, and *well-rounded* youth in terms of high occupational orientations. This group also reported low perceived family hardship and the lowest academic achievement compared to all other clusters. Given that this group had positive work orientations, low aspirations, and poor self-reported academic performance, this group was labeled *Work Focused* work-bound youth.

Table 8

Means and Standard Deviations for Final Six Cluster Solution

Variable	Sample	Ambitious	Persistent	Well Rounded	Average	Multiple Disadvantage	Work Focused
		Cluster 1	*Cluster 2*	*Cluster 3*	*Cluster 4*	*Cluster 5*	*Cluster 6*
N (%)	1655 (100%)	243 (14.7%)	175 (10.6%)	515 (31.1%)	191 (11.5%)	157 (9.5%)	374 (22.6%)
Homogeneity Coefficient	2.00	1.19	1.08	0.67	1.31	1.12	0.73
1. Educational Aspirations	16.25 (2.86)	19.76[a] (2.59)	17.95[b] (2.46)	16.35[c] (2.19)	14.89[d] (2.00)	14.06[e] (1.83)	14.65[e] (2.02)
2. Occupational Aspirations	15.22 (2.75)	19.94[a] (2.24)	15.81[b] (2.05)	14.62[c] (1.66)	14.39[c] (1.91)	13.60[d] (1.61)	13.83[d] (1.73)
3. Occupational Orientation	5.64 (0.51)	5.75[a] (0.37)	5.71[abe] (0.34)	5.84[c] (0.24)	4.60[d] (0.51)	5.58[e] (0.43)	5.80[ac] (0.28)
4. Family Hardship	1.86 (0.99)	1.46[ab] (0.58)	3.54[c] (0.72)	1.43[ab] (0.48)	1.57[b] (0.54)	3.44[c] (0.76)	1.41[a] (0.43)
5. Academic Achievement	6.12 (1.49)	6.78[a] (1.18)	6.85[ab] (0.98)	7.08[b] (0.76)	6.03[c] (1.48)	4.99[d] (1.30)	4.52[e] (0.99)

Note: All ANOVAs are significant at $p < .001$ (1. $F(5, 1649) = 230.86$, $\eta^2 = .41$; 2. $F(5, 1649) = 411.09$, $\eta^2 = .55$; 3. $F(5, 1649) = 409.68$, $\eta^2 = .55$; 4. $F(5, 1649) = 713.29$, $\eta^2 = .68$; 5. $F(5, 1649) = 328.81$, $\eta^2 = .50$). Group means in each row that share a superscript do not statistically significantly differ at $p \leq .01$ level. Although not a focus of this study, 11.5% of the analytic sample planned to enter the military with 2.0% aspiring to a military career at age 30. The proportion of cluster members who plan to enter the military at some point is as follows: *Ambitious* (7.1%), *Persistent* (12.2%), *Well Rounded* (8.1%), *Average* (11.3%), *Multiple Disadvantage* (17.6%), and *Work Focused* (16.0%).

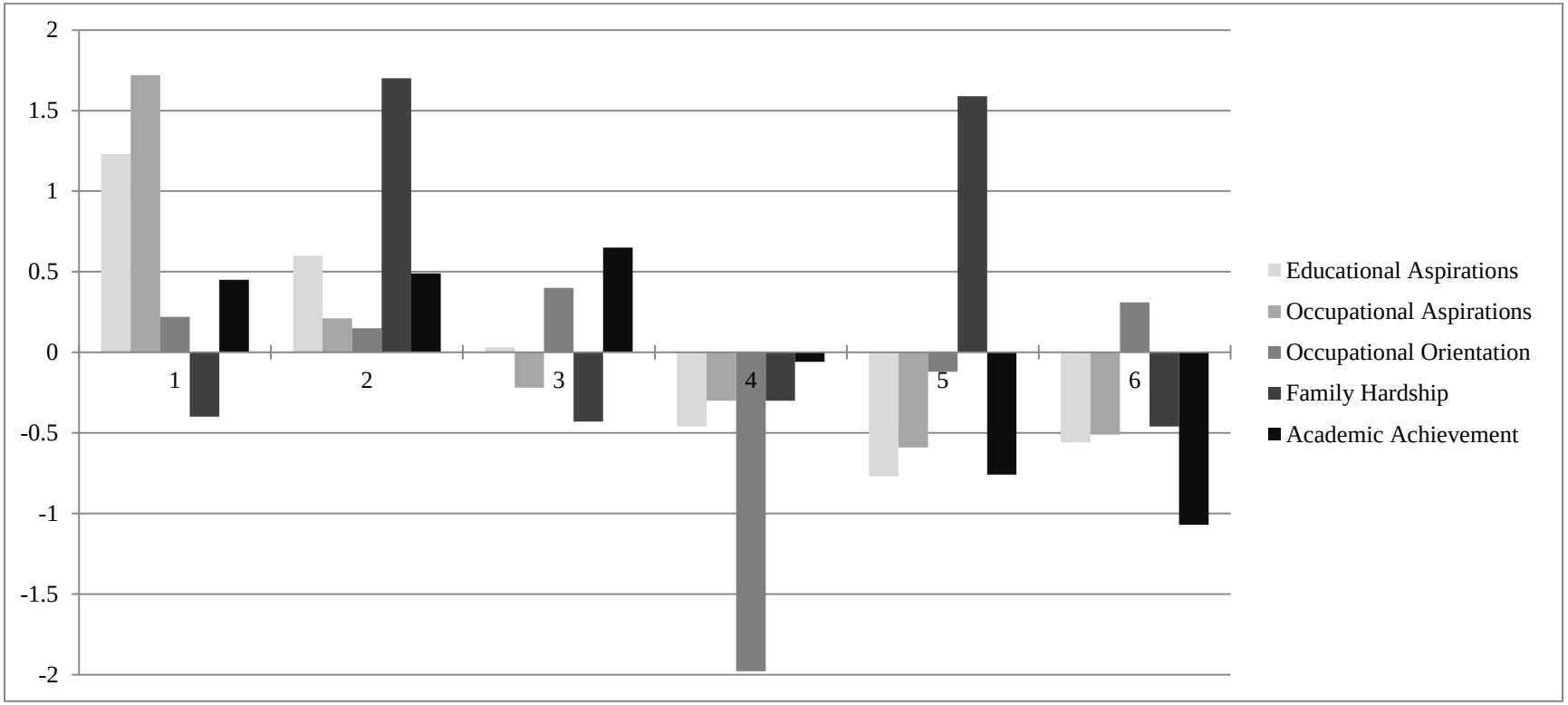

Figure 5. Final cluster solution standardized scores on clustering variables. Note: 1 = Ambitious; 2 = Persistent; 3 = Well Rounded; 4 = Average; 5 = Multiple Disadvantage; 6 = Work Focused.

Reliability and validity analysis of final cluster solution. Please see Appendix D for a full discussion of the procedures and findings from the reliability and validity analysis of the final cluster solution. Here a brief summary is provided. The reliability of the final cluster solution was assessed using a procedure suggested by Bergman and colleagues (2003) that involved conducting the same cluster analysis on a randomly selected two-thirds sample of the full analytic sample and then comparing results from the two-thirds sample to the full sample. Inspection of the cluster means in Table 9 (below) suggests that the final 6-cluster solution using the reliability sample produced similar clusters compared to the full sample. In support of this interpretation, a comparison of cluster centroids between the full and two-thirds sample using the CENTROID program (not shown, see Appendix D) indicated that the reliability sample clusters were similar to the full sample clusters.

I assessed the validity of the final cluster solution by evaluating clusters in terms of teacher-reported educational expectations and grades (see Table 10 below). Validity of the final cluster solution would be supported by evidence that the clusters were distinct based on teacher-reported expectations and grades. Also, if teachers reported similar patterns of expectations and grades to those found in the clusters (from students' self reports), this would further support the validity of the final cluster solution. In general, teacher reports suggested that the final cluster solution did result in distinct clusters, with teachers generally having higher educational expectations and grades for *ambitious*, *persistent*, and *well-rounded* youth when compared to *average*, *multiple-disadvantage*, and *work-focused* youth. However, it should be acknowledged that complete group separation was not achieved. In general, teachers viewed *multiple-disadvantage* and *work-focused* youth as similar, as well as *ambitious* and *well-rounded* youth, and *persistent* and *average* youth on both grades and PSE expectations.

Table 9

Means and Standard Deviations for Full and Reliability Sample

	K-Means (Final) Cluster Results with Full Analytic Sample						
Variable	Sample	Ambitious	Persistent	Well Rounded	Average	Multiple Disadvantage	Work Focused
N (%)	1655 (100%)	243 (14.7%)	175 (10.6%)	515 (31.1%)	191 (11.5%)	157 (9.5%)	374 (22.6%)
Homogeneity Coefficient	2.00	1.19	1.08	0.67	1.31	1.12	0.73
Education Aspirations	16.25 (2.86)	19.76 (2.59)	17.95 (2.46)	16.35 (2.19)	14.89 (2.00)	14.06 (1.83)	14.65 (2.02)
Occupation Aspirations	15.22 (2.75)	19.94 (2.24)	15.81 (2.05)	14.62 (1.66)	14.39 (1.91)	13.60 (1.61)	13.83 (1.73)
Occupation Orientation	5.64 (0.51)	5.75 (0.37)	5.71 (0.34)	5.84 (0.24)	4.60 (0.51)	5.58 (0.43)	5.80 (0.28)
Family Hardship	1.86 (0.99)	1.46 (0.58)	3.54 (0.72)	1.43 (0.48)	1.57 (0.54)	3.44 (0.76)	1.41 (0.43)
Academic Achievement	6.12 (1.49)	6.78 (1.18)	6.85 (0.98)	7.08 (0.76)	6.03 (1.48)	4.99 (1.30)	4.52 (0.99)
	K-Means (Final) Cluster Results with Reliability Sample						
N (%)	1104 (100%)	127 (11.5%)	109 (9.9%)	363 (32.9%)	143 (12.9%)	116 (10.5%)	246 (22.3%)
Homogeneity Coefficient	2.00	1.28	1.04	0.68	1.33	1.16	0.70
Education Aspirations	16.28 (2.86)	19.87 (2.84)	18.39 (2.46)	16.71 (2.23)	14.56 (1.92)	14.31 (1.84)	14.78 (2.04)
Occupation Aspirations	15.29 (2.73)	20.68 (1.99)	15.83 (1.97)	14.82 (1.71)	14.22 (1.82)	13.83 (1.66)	13.81 (1.72)
Occupation Orientation	5.64 (0.51)	5.70 (0.58)	5.70 (0.35)	5.86 (0.22)	4.70 (0.54)	5.60 (0.42)	5.83 (0.24)
Family Hardship	1.86 (0.99)	1.54 (0.60)	3.35 (0.67)	1.41 (0.46)	1.57 (0.56)	3.57 (0.82)	1.40 (0.43)
Academic Achievement	6.11 (1.44)	6.54 (1.21)	6.89 (0.93)	7.10 (0.77)	6.06 (1.42)	5.05 (1.24)	4.61 (0.93)

Table 10

Teacher-Reported Means and Standard Deviations on Cluster Educational Expectations and Grades

Variable	Sample	Ambitious	Persistent	Well Rounded	Average	Multiple Disadvantage	Work Focused
N (%)	1655 (100%)	243 (14.7%)	175 (10.6%)	515 (31.1%)	191 (11.5%)	157 (9.5%)	374 (22.6%)
1. Education Expectations	13.90 (2.03)	14.79^{a} (2.21)	14.10^{bc} (2.07)	14.41^{ab} (2.07)	13.83^{c} (2.07)	12.88^{d} (1.47)	12.93^{d} (1.34)
2. Grades	5.67 (1.71)	6.26^{a} (1.55)	6.16^{ab} (1.56)	6.31^{a} (1.41)	5.79^{b} (1.64)	4.60^{c} (1.49)	4.55^{c} (1.60)

Note: All ANOVAs are significant at $p < .001$ (1. $F(5, 1460) = 41.32$, $\eta^2 = .12$; 2. $F(5, 1487) = 76.01$, $\eta^2 = .20$). Group means in each row that share a superscript do not statistically significantly differ at $p \leq .05$ level.

Research Questions 2 and 3

Demographic and rural locale evaluation of work-bound clusters. Research questions 2 and 3 concern whether the identified work-bound clusters differed in terms of gender, ethnicity, and school location. In terms of the demographic characteristics of the final cluster solution (Table 11), girls were more likely to be members of the *ambitious* and *persistent* clusters and less likely to be members of the *average, multiple-disadvantage*, and *work-focused* clusters than boys, χ^2 (5) = 73.36, $p < .001$.[41] There were no statistically significant differences between the work-bound clusters on ethnicity, χ^2 (15) = 11.76, $p = .70$, or school location, χ^2 (10) = 10.74, $p = .38$. One concern regarding the analysis of difference in clusters on race and ethnicity is the small cell sizes for some groups. However, collapsing the groups into two groups (White vs. other) also did not result in statistically significant differences, χ^2 (5) = 5.49, $p = .36$. Also, collapsing locale into two groups (rural remote vs. other) did not result in statistically significant differences, χ^2 (5) = 7.92, $p = .16$.

[41] Fisher's exact probability < .05 for all clusters on gender except for *well-rounded* youth.

Table 11

Evaluation of Final Cluster Solution in Terms of Demographic Characteristics and Rural Locale

Variable	Sample	Ambitious	Persistent	Well Rounded	Average	Multiple Disadvantage	Work Focused
N (%)	1655 (100)	243 (14.7)	175 (10.6)	515 (31.1)	191 (11.5)	157 (9.5)	374 (22.6)
Gender (female)	849 (51.3)	155 (63.8)	120 (68.6)	280 (54.5)	83 (43.5)	70 (44.6)	141 (37.7)
Race/ Ethnicity							
White	1090 (66.6)	150 (62.2)	110 (63.6)	352 (69.3)	130 (68.4)	107 (68.2)	241 (64.6)
African American	112 (6.8)	17 (7.1)	16 (9.2)	31 (6.1)	9 (4.7)	10 (6.4)	29 (7.8)
Hispanic	193 (11.8)	33 (13.7)	19 (11.0)	55 (10.8)	20 (10.5)	23 (14.6)	43 (11.5)
Other	247 (15.0)	41 (17.0)	28 (16.2)	70 (13.8)	31 (16.3)	17 (10.8)	60 (16.1)
Locale							
Small Town	369 (22.3)	51 (21.0)	40 (22.9)	104 (20.2)	46 (24.1)	31 (19.7)	97 (25.9)
Rural Fringe/Distant	549 (33.2)	87 (35.8)	59 (33.7)	170 (33.0)	56 (29.3)	47 (29.9)	130 (34.8)
Rural Remote	737 (44.5)	105 (43.2)	76 (43.4)	241 (46.8)	89 (46.6)	79 (50.3)	147 (39.3)

Note. Values in parentheses are percentages.

Research Questions 4 and 5

One of the primary goals of this study was to explore how clusters differed in terms of perceived educational and occupational barriers and schooling experiences. I conducted a series of multinomial logistic regression analyses to assess the degree to which perceived barriers and schooling experiences further distinguished the six groups. This section begins with a discussion of data screening of the variables used in the multinomial logistic regression, followed an evaluation of the overall model fit, and ending with an evaluation of cluster differences on barrier and schooling experience variables.

Data screening of multinomial logistic regression variables. Table 12 provides descriptive statistics and a summary of missing data for each variable used in the multinomial logistic regression analysis. To save space, this table also contains a summary of all statistically significant pairwise cluster comparisons from the multinomial logistic regression analysis (discussed later). Appendix E provides a full discussion of missing data as well as procedures used to impute the final analytic dataset. Here a summary of findings is reported.

Missing data ranged from 0% (locale code) to 10.0% (career exploration) across variables. Listwise deletion would have resulted in the exclusion of 17.5% of the sample. However, 93.9% of the sample was missing less than three of the 10 variables included in the model. Results of missing data analysis indicated that while data could not be assumed to be Missing Completely at Random (MCAR), data could be assumed to be Missing at Random (MAR) which is a requirement of multiple imputation (Enders, 2010). An evaluation of the survey instrument and a series of logistic regression models estimated to predict item missingness suggested that missingness was related to location of the items in the survey as scales that appeared near the end of the survey typically had more missing data. Also, participants with lower self-reported academic achievement tended to have more missing data suggesting that some students may have experienced survey fatigue. Following data screening, I imputed 50 datasets. Inspection of pooled descriptive summaries (compared to original dataset) for the full sample and individual clusters as well as an examination of trace plots of estimated parameters suggested no model convergence issues or other problematic patterns of results.

Overall model results. Tables 13 through 18 include results from the multinomial logistic regression model predicting cluster membership from self-reported barriers and schooling experiences. The model was estimated with each cluster as a base group so all pairwise

comparisons could be evaluated given that no *a priori* comparisons were specified. Statistically significant comparisons in Tables 13 through 18 are noted in Table 12 to aid the reader.

I entered predictors in blocks to better understand the relative contribution of background characteristics, perceived hardships, and schooling experiences in predicting cluster membership. Gender, race/ethnicity, and rural locale were entered in the first block as control variables. This model was statistically significant compared to the intercept only model, χ^2 (29) = 95.27, $p <$ .001, (total pseudo R^2 = .02). Adding the perceived hardship variables resulted in a model improvement that was statistically significant, χ^2 (15) = 80.98, $p <$ .001, (total pseudo R^2 = .03). Adding the schooling experience variables resulted in a statistically significant improvement in model fit, χ^2 (15) = 413.72, $p <$ .001, (total pseudo R^2 = .11). The final model accurately classified 39% of cluster members. Although model classification accuracy was modest, the model was useful because it exceeded the accuracy rate that would be expected by chance.[42]

Results on individual variables. Because clusters were evaluated in terms of demographic and rural locale differences in the previous section and these variables were used as control variables in the current analysis, here I only discuss results around perceived barriers and schooling experiences. To aid the reader in evaluating cluster differences, Table 12 notes all pairwise comparisons that are statistically significant across Tables 13 - 18.

Perceived barriers. In terms of positive job perceptions, *persistent* youth reported statistically significantly lower positive job perceptions (M = 2.59) compared to all other groups, but *ambitious* youth (M = 2.71) after controlling for all other variables in the model. *Ambitious* youth had less positive job perceptions, but the differences were only statistically significant

[42] The by chance accuracy rate was calculated by squaring and summing the proportion of cases within each group ($0.147^2 + 0.105^2 + 0.309^2 + 0.116^2 + 0.096^2 + 0.227^2 = .202$). To consider this model useful, the observed accuracy was compared to an accuracy rate that was 25% greater than would be expected by chance. For this study the greater than chance accuracy rate would be 25.3% (.202*1.25 = .253).

compared to *well-rounded* (*M* = 2.95) and *work-focused* youth (*M* = 3.11). *Work-focused* youth had the highest positive job perceptions, but the difference was only statistically significant compared to *ambitious* and *persistent* youth. Differences between *well-rounded*, *average*, *multiple-disadvantage*, and *work-focused* youth were not statistically significant (*M* = 2.95, 2.83, 2.98, and 3.11, respectively on a 6-point scale). In summary, *ambitious* and *persistent* youth tended to have the lowest positive job perceptions compared to other groups, whereas work-focused youth had the highest, but this last finding was only statistically significant compared to *ambitious* and *persistent* youth.

In terms of educational barriers, *ambitious*, *well-rounded*, and *average* youth did not statistically significantly differ from each other (*M* = 2.90, 2.94, and 2.86, respectively on a 6-point scale) and tended to have the lowest reported barriers. *Persistent*, *multiple-disadvantage*, and *work-focused* youth also did not differ from each other (*M* = 3.34, 3.35, and 3.11, respectively), but all three groups reported statistically significantly higher educational barriers compared to *ambitious*, *well-rounded*, and *average* youth. In terms of occupational barriers, *work-focused* youth reported statistically significantly fewer occupational barriers (*M* = 2.49, on a 6-point scale) compared to all other groups, controlling for other variables in the model. No other differences were statistically significant.

Schooling experiences. In terms of career counseling, analyses revealed no statistically significant differences between clusters. On average, the sample as a whole reported low levels of career counseling (*M* = 2.30, on a 4-point scale). In terms of career exploration, *ambitious*, *persistent*, *well-rounded*, and *average* youth did not statistically significantly differ from each other (*M* = 1.47, 1.53, 1.51, 1.48, respectively on a 4-point scale). However, *multiple-disadvantage* (*M* = 1.58) and *work-focused* (*M* = 1.58) youth were statistically significantly more

likely to take part in career exploration compared to *ambitious* (*M* = 1.47) and *well-rounded* youth (*M* = 1.51).[43] It is important to note that across all work-bound groups, self-reported career exploration involvement was rather low (*M* = 1.53) with the overall mean value being between "never" and "one to two times this year" on the original scale.

In terms of academic self-concept, *work-focused* youth had the lowest self-concept (*M* = 4.42) that was statistically significant compared to all other clusters. *Average* (*M* = 4.64) and *multiple-disadvantage youth* (*M* = 4.60) had statistically significantly lower self-concept compared to the *ambitious*, *persistent*, and *well-rounded* youth (*M* = 5.36, 5.19, 5.20, respectively on a 7-point scale), who did not differ significantly from each other. These three groups had had the highest self-concept after controlling for other variables in the model.

In terms of school valuing, *ambitious* youth had statistically significantly higher valuing (*M* = 4.85 on a 6-point scale) compared to all other groups except *persistent* youth (*M* = 4.77). *Persistent* youth had statistically significantly higher school valuing compared to *average* (*M* = 4.06) and *work-focused* youth (*M* = 4.21) only. *Average* youth had lower valuing compared to all other clusters except *multiple-disadvantage* youth (*M* = 4.27). Although *work-focused* youth had statistically significantly higher valuing compared to *average* youth and lower valuing compared to *ambitious* and *persistent* youth, *work-focused* youth did not statistically significantly differ from *well-rounded* youth *or multiple-disadvantage youth* in terms of school valuing.

In terms of school belonging, *ambitious* (*M* = 3.82 on a 5-point scale) and *well-rounded* youth (*M* = 3.77) did not statistically significantly differ from each other, but reported significantly higher belonging compared to *persistent* (*M* = 3.58), *average* (*M* = 3.26), *multiple-*

[43] Although mean differences between groups appear small, after controlling for other variables in the model, an inspection of odds-ratios (see Tables 13 and 15) indicate that *multiple-disadvantage* youth and *work-focused* youth were 64% and 56% more likely to take part in career exploration (respectively), compared to *ambitious* youth and 42% and 35% more likely to take part in career exploration (respectively), compared to *well-rounded* youth.

disadvantage (*M* = 3.18), and *work-focused* youth (*M* = 3.30) who reported levels of belonging that did not statistically significantly differ from each other.

In terms of academic program, *multiple-disadvantage youth* were less statistically significantly likely to be in college preparation program relative to general program compared to *ambitious*, *persistent*, and *well-rounded* youth, but did not differ from *average* and *work-focused* youth on college preparation program. *Work-focused* youth were statistically significantly less likely to be in a college preparation program relative to general program compared to *ambitious* and *persistent* youth, but did not differ from *well-rounded*, *average*, and *multiple-disadvantage youth* on college preparation program. In addition, *multiple-disadvantage* and *work-focused* youth were more likely to be in a vocational/technical program relative to general program compared to *ambitious* youth. It should be noted that overall, few work-bound youth in general were enrolled in a college or vocational preparation program (16.9% and 8.7%, respectively) and that 10.4% of students were unsure of what type of program they were enrolled.

Table 12
Descriptive Statistics on Multinomial Logistic Regression Variables by Work-Bound Cluster

Variable	Sample	Ambitious	Persistent	Well Rounded	Average	Multiple Disadvantage	Work Focused	% Imputed
N (%)	1642 (100%)	241 (14.7%)	173 (10.5%)	508 (30.9%)	190 (11.6%)	157 (9.6%)	373 (22.7%)	
Background								
Gender (female)	841 (51.2%)	153^{a} (63.5%)	118^{b} (68.2%)	277^{c} (54.5%)	83^{d} (43.7%)	70^{d} (44.6%)	140^{e} (37.5%)	0.0
Race/Ethnicity								0.0
White (ref)	1090 (66.4%)	150 (62.2%)	110 (63.6%)	352 (69.3%)	130 (68.4%)	107 (68.2%)	241 (64.6%)	
African American	112 (6.8%)	17^{a} (7.1%)	16^{a} (9.3%)	31^{a} (6.1%)	9^{a} (4.7%)	10^{a} (6.4%)	29^{a} (7.8%)	
Hispanic	193 (11.8%)	33^{a} (13.7%)	19^{a} (11.0%)	55^{a} (10.8%)	20^{a} (10.5%)	23^{a} (14.7%)	43^{a} (11.5%)	
Other	247 (15.0%)	41^{ab} (17.0%)	28^{ab} (16.2%)	70^{ab} (13.8%)	31^{ab} (16.3%)	17^{a} (10.8%)	60^{b} (16.1%)	
Locale								
Small town (ref)	367 (22.3%)	51 (21.2%)	40 (23.1%)	102 (20.1%)	46 (24.2%)	31 (19.8%)	97 (26.0%)	0.0
Rural fringe/distant	542 (33.0%)	85^{a} (35.3%)	58^{a} (33.5%)	167^{a} (32.9%)	55^{a} (29.0%)	47^{a} (29.9%)	130^{a} (34.9%)	
Rural remote	733 (44.6%)	105^{abc} (43.6%)	75^{abc} (43.4%)	239^{ab} (47.0%)	89^{abc} (46.8%)	79^{b} (50.3%)	146^{c} (39.1%)	
Perceived hardship								
Positive job perceptions	2.90 (1.13)	2.71^{ab} (1.05)	2.59^{a} (1.05)	2.95^{c} (1.12)	2.83^{bc} (1.00)	2.98^{bc} (1.31)	3.11^{c} (1.15)	7.0
Educational barriers	3.04 (1.15)	2.90^{a} (1.15)	3.34^{b} (1.17)	2.94^{a} (1.19)	2.86^{a} (1.00)	3.35^{b} (1.17)	3.11^{b} (1.11)	1.1
Occupational barriers	2.62 (1.30)	2.60^{a} (1.30)	2.95^{a} (1.40)	2.59^{a} (1.36)	2.53^{a} (1.10)	2.85^{a} (1.26)	2.49^{b} (1.19)	2.8
Schooling experiences								
Career counseling	2.30 (0.71)	2.46^{a} (0.73)	2.36^{a} (0.73)	2.38^{a} (0.71)	2.18^{a} (0.68)	2.16^{a} (0.64)	2.19^{a} (0.70)	8.3
Career exploration	1.53 (0.57)	1.47^{a} (0.52)	1.53^{ab} (0.59)	1.51^{a} (0.53)	1.48^{ab} (0.57)	1.58^{b} (0.65)	1.58^{b} (0.59)	10.0
Academic self-concept	4.92 (1.03)	5.36^{a} (0.91)	5.19^{a} (0.94)	5.20^{a} (0.94)	4.64^{b} (0.95)	4.60^{b} (1.06)	4.42^{c} (0.98)	1.3
School valuing	4.47 (1.00)	4.85^{a} (0.84)	4.77^{ab} (0.91)	4.61^{bcd} (0.95)	4.06^{e} (0.93)	4.27^{bed} (1.07)	4.21^{d} (1.05)	2.0
School belonging	3.54 (0.87)	3.82^{a} (0.74)	3.58^{b} (0.85)	3.77^{a} (0.83)	3.26^{b} (0.79)	3.18^{b} (0.89)	3.30^{b} (0.87)	4.3
High School Program								3.3
General (ref)	1051 (64.0%)	142 (58.8%)	101 (58.6%)	337 (66.2%)	125 (65.7%)	101 (64.1%)	246 (66.0%)	
College	278 (16.9%)	65^{ab} (26.9%)	44^{b} (25.4%)	103^{abc} (20.3%)	24^{ace} (12.7%)	7de (4.5%)	34^{cd} (9.3%)	
Vocational	142 (8.7%)	9^{a} (4.0%)	9^{ab} (5.0%)	41^{ab} (8.1%)	16^{ab} (8.4%)	21^{b} (13.1%)	46^{b} (12.3%)	
Don't know	171 (10.4%)	25^{ab} (10.3%)	19^{abc} (11.0%)	27^{c} (5.3%)	25^{ad} (13.2%)	28^{a} (18.1%)	47^{bd} (12.5%)	

Note. Means and standard deviations reported for continuous variables. Clusters that share superscripts do not statistically differ at $p < .05$ level.

Table 13

Multinomial Logistic Regression Results Predicting Group Membership with Ambitious Cluster as Reference Group

	Reference Group: Ambitious														
	Persistent			Well Rounded			Average			Multiple Disadvantage			Work Focused		
Variables	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR
Background characteristics															
Gender (female)	0.15	0.21	1.16	-0.32*	0.16	0.73	-0.84***	0.20	0.43	-0.83***	0.22	0.44	-1.08***	0.19	0.34
Race/Ethnicity															
White (ref)															
African American	0.21	0.37	1.24	0.01	0.32	1.01	-0.10	0.58	0.90	0.17	0.37	1.19	0.46	0.44	1.59
Hispanic	-0.41†	0.25	0.66	-0.31	0.24	0.74	-0.42	0.33	0.66	-0.27	0.23	0.76	-0.32	0.24	0.72
Other	-0.06	0.26	0.94	-0.27	0.21	0.76	-0.04	0.28	0.96	-0.50	0.33	0.60	0.03	0.23	1.03
Locale															
Small town (ref)															
Rural fringe/distant	-0.18	0.26	0.84	0.05	0.23	1.05	-0.29	0.33	0.75	-0.07	0.26	0.93	-0.25	0.29	0.78
Rural remote	-0.07	0.24	0.94	0.15	0.21	1.17	-0.09	0.30	0.91	0.23	0.25	1.26	-0.37	0.28	0.69
Perceived hardship															
Positive job perceptions	-0.09	0.10	0.91	0.20**	0.07	1.23	0.12	0.10	1.12	0.19	0.12	1.21	0.31**	0.10	1.36
Educational barriers	0.34*	0.14	1.40	0.02	0.10	1.02	-0.06	0.12	0.94	0.32*	0.15	1.38	0.23*	0.09	1.26
Occupational barriers	-0.02	0.13	0.98	-0.02	0.09	0.98	-0.02	0.11	0.98	-0.06	0.13	0.94	-0.28**	0.09	0.75
Schooling experiences															
Career counseling	-0.15	0.16	0.86	-0.09	0.13	0.91	-0.08	0.16	0.92	-0.19	0.15	0.83	-0.12	0.16	0.89
Career exploration	0.28	0.24	1.33	0.14	0.17	1.16	0.26	0.23	1.29	0.50*	0.22	1.64	0.45*	0.20	1.56
Academic self-concept	-0.10	0.15	0.91	-0.18†	0.10	0.84	-0.67***	0.13	0.51	-0.63***	0.14	0.53	-0.95***	0.14	0.39
School valuing	0.00	0.13	1.00	-0.24**	0.08	0.79	-0.51***	0.11	0.60	-0.28*	0.13	0.75	-0.31**	0.10	0.74
School belonging	-0.33**	0.12	0.72	0.02	0.11	1.02	-0.39**	0.15	0.67	-0.63**	0.18	0.53	-0.41**	0.14	0.66
High School Program															
General (ref)															
College	0.14	0.25	1.15	-0.30	0.19	0.74	-0.42	0.27	0.66	-1.32**	0.50	0.27	-0.63*	0.31	0.53
Vocational	0.21	0.47	1.23	0.57†	0.33	1.77	0.66	0.50	1.93	1.09**	0.41	2.96	0.99*	0.39	2.70
Don't know	0.06	0.38	1.06	-0.75**	0.29	0.47	0.04	0.36	1.04	0.33	0.25	1.39	-0.17	0.31	0.85
Intercept	0.58	0.83	-	2.45**	0.72	-	7.24***	1.06	-	5.03***	0.92	-	7.55***	0.89	-
Log pseudo likelihood[a]	-2483.88														
Pseudo R^{2a}	0.11														
N	1642														

a. Fit statistics based on one complete and imputed data set.

*** $p < .001$ ** $p < .01$ * $p < .05$ † $p < .10$ (two-tailed test)

Table 14

Multinomial Logistic Regression Results Predicting Group Membership with Persistent Cluster as Reference Group

	Reference Group: Persistent														
	Ambitious			Well Rounded			Average			Multiple Disadvantage			Work Focused		
Variables	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR
Background characteristics															
Gender (female)	-0.15	0.21	0.86	-0.47*	0.22	0.63	-0.99***	0.25	0.37	-0.97***	0.26	0.38	-1.22***	0.21	0.29
Race/Ethnicity															
White (ref)															
African American	-0.21	0.37	0.81	-0.21	0.36	0.81	-0.32	0.58	0.73	-0.04	0.46	0.96	0.25	0.48	1.29
Hispanic	0.41†	0.25	1.51	0.11	0.22	1.11	-0.01	0.40	0.99	0.14	0.23	1.15	0.09	0.25	1.10
Other	0.06	0.26	1.06	-0.21	0.22	0.81	0.02	0.24	1.02	-0.44	0.34	0.64	0.09	0.26	1.10
Locale															
Small town (ref)															
Rural fringe/distant	0.18	0.26	1.20	0.23	0.25	1.26	-0.11	0.31	0.90	0.11	0.29	1.12	-0.07	0.30	0.94
Rural remote	0.07	0.24	1.07	0.22	0.20	1.25	-0.03	0.26	0.97	0.30	0.25	1.35	-0.30	0.29	0.74
Perceived hardship															
Positive job perceptions	0.09	0.10	1.10	0.30***	0.08	1.35	0.21*	0.10	1.24	0.28*	0.11	1.33	0.40***	0.10	1.50
Educational barriers	-0.34*	0.14	0.71	-0.32**	0.12	0.73	-0.40**	0.13	0.67	-0.01	0.16	0.99	-0.11	0.12	0.90
Occupational barriers	0.02	0.13	1.02	0.00	0.11	1.00	0.00	0.12	1.00	-0.04	0.13	0.96	-0.26*	0.11	0.77
Schooling experiences															
Career counseling	0.15	0.16	1.17	0.06	0.15	1.07	0.07	0.17	1.08	-0.03	0.19	0.97	0.04	0.19	1.04
Career exploration	-0.28	0.24	0.75	-0.14	0.17	0.87	-0.02	0.24	0.98	0.21	0.24	1.24	0.16	0.21	1.18
Academic self-concept	0.10	0.15	1.10	-0.08	0.13	0.92	-0.57***	0.16	0.56	-0.54**	0.15	0.59	-0.85***	0.16	0.43
School valuing	0.00	0.13	1.00	-0.24†	0.13	0.79	-0.52***	0.14	0.60	-0.28	0.17	0.75	-0.31**	0.12	0.73
School belonging	0.33**	0.12	1.39	0.35**	0.13	1.42	-0.06	0.16	0.94	-0.30†	0.17	0.74	-0.08	0.14	0.92
High School Program															
General (ref)															
College	-0.14	0.25	0.87	-0.44†	0.24	0.64	-0.56*	0.28	0.57	-1.46**	0.51	0.23	-0.77*	0.32	0.46
Vocational	-0.21	0.47	0.81	0.36	0.42	1.44	0.45	0.59	1.57	0.88†	0.47	2.40	0.78†	0.42	2.19
Don't know	-0.06	0.38	0.94	-0.81†	0.42	0.44	-0.02	0.38	0.98	0.27	0.36	1.31	-0.23	0.34	0.80
Intercept	-0.58	0.83	-	1.87*	0.73	-	6.66***	0.95	-	4.45***	0.80	-	6.97***	0.83	-
Log pseudo likelihood[a]	-2483.88														
Pseudo R^{2a}	0.11														
N	1642														

a. Fit statistics based on one complete and imputed data set.

*** $p < .001$ ** $p < .01$ * $p < .05$ † $p < .10$ (two-tailed test)

Table 15

Multinomial Logistic Regression Results Predicting Group Membership with Well-Rounded Cluster as Reference Group

	Reference Group: Well Rounded														
	Ambitious			Persistent			Average			Multiple Disadvantage			Work Focused		
Variables	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR
Background characteristics															
Gender (female)	0.32*	0.16	1.38	0.47*	0.22	1.59	-0.52**	0.19	0.59	-0.51*	0.21	0.60	-0.76***	0.13	0.47
Race/Ethnicity															
White (ref)															
African American	-0.01	0.32	0.99	0.21	0.36	1.23	-0.11	0.39	0.90	0.16	0.38	1.18	0.46	0.40	1.58
Hispanic	0.31	0.24	1.36	-0.11	0.22	0.90	-0.11	0.42	0.90	0.04	0.24	1.04	-0.01	0.26	0.99
Other	0.27	0.21	1.31	0.21	0.22	1.23	0.23	0.25	1.26	-0.23	0.26	0.79	0.30	0.23	1.35
Locale															
Small town (ref)															
Rural fringe/distant	-0.05	0.23	0.95	-0.23	0.25	0.79	-0.34	0.21	0.71	-0.12	0.24	0.89	-0.30	0.25	0.74
Rural remote	-0.15	0.21	0.86	-0.22	0.20	0.80	-0.25	0.20	0.78	0.08	0.25	1.08	-0.52*	0.24	0.59
Perceived hardship															
Positive job perceptions	-0.20**	0.07	0.82	-0.30***	0.08	0.74	-0.09	0.08	0.92	-0.02	0.09	0.98	0.11	0.08	1.11
Educational barriers	-0.02	0.10	0.98	0.32**	0.12	1.38	-0.07	0.10	0.93	0.31*	0.13	1.36	0.21*	0.09	1.24
Occupational barriers	0.02	0.09	1.02	0.00	0.11	1.00	0.00	0.09	1.00	-0.04	0.11	0.96	-0.26**	0.08	0.77
Schooling experiences															
Career counseling	0.09	0.13	1.09	-0.06	0.15	0.94	0.01	0.13	1.01	-0.10	0.14	0.91	-0.03	0.15	0.97
Career exploration	-0.14	0.17	0.87	0.14	0.17	1.15	0.11	0.18	1.12	0.35*	0.18	1.42	0.30*	0.15	1.35
Academic self-concept	0.18†	0.10	1.19	0.08	0.13	1.08	-0.50***	0.10	0.61	-0.46***	0.12	0.63	-0.77***	0.10	0.46
School valuing	0.24**	0.08	1.27	0.24†	0.13	1.27	-0.27**	0.10	0.76	-0.04	0.13	0.96	-0.07	0.10	0.93
School belonging	-0.02	0.11	0.98	-0.35**	0.13	0.71	-0.41***	0.12	0.66	-0.65***	0.16	0.52	-0.43***	0.11	0.65
High School Program															
General (ref)															
College	0.30	0.19	1.35	0.44†	0.24	1.55	-0.12	0.24	0.89	-1.02*	0.43	0.36	-0.33	0.27	0.72
Vocational	-0.57†	0.33	0.56	-0.36	0.42	0.70	0.09	0.38	1.09	0.51	0.31	1.67	0.42†	0.25	1.52
Don't know	0.75**	0.29	2.12	0.81†	0.42	2.25	0.79*	0.33	2.20	1.08***	0.28	2.95	0.59*	0.28	1.80
Intercept	-2.45**	0.72	-	-1.87*	0.73	-	4.79***	0.67	-	2.58***	0.68	-	5.10***	0.58	-
Log pseudo likelihood[a]	-2483.88														
Pseudo R^{2a}	0.11														
N	1642														

a. Fit statistics based on one complete and imputed data set.

*** $p < .001$ ** $p < .01$ * $p < .05$ † $p < .10$ (two-tailed test)

Table 16

Multinomial Logistic Regression Results Predicting Group Membership with Average Cluster as Reference Group

	Reference Group: Average														
	Ambitious			Persistent			Well Rounded			Multiple Disadvantage			Work Focused		
Variables	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR
Background characteristics															
Gender (female)	0.84***	0.20	2.32	0.99***	0.25	2.68	0.52**	0.19	1.69	0.02	0.20	1.02	-0.23	0.17	0.79
Race/Ethnicity															
White (ref)															
African American	0.10	0.58	1.11	0.32	0.58	1.37	0.11	0.39	1.11	0.27	0.63	1.31	0.57	0.38	1.76
Hispanic	0.42	0.33	1.52	0.01	0.40	1.01	0.11	0.42	1.12	0.15	0.31	1.16	0.10	0.31	1.10
Other	0.04	0.28	1.04	-0.02	0.24	0.98	-0.23	0.25	0.79	-0.47	0.32	0.63	0.07	0.24	1.07
Locale															
Small town (ref)															
Rural fringe/distant	0.29	0.33	1.33	0.11	0.31	1.11	0.34	0.21	1.40	0.22	0.31	1.24	0.04	0.25	1.04
Rural remote	0.09	0.30	1.10	0.03	0.26	1.03	0.25	0.20	1.28	0.32	0.30	1.38	-0.27	0.20	0.76
Perceived hardship															
Positive job perceptions	-0.12	0.10	0.89	-0.21*	0.10	0.81	0.09	0.08	1.09	0.07	0.12	1.07	0.19†	0.10	1.21
Educational barriers	0.06	0.12	1.06	0.40**	0.13	1.48	0.07	0.10	1.08	0.38**	0.12	1.46	0.29**	0.11	1.33
Occupational barriers	0.02	0.11	1.02	0.00	0.12	1.00	0.00	0.09	1.00	-0.04	0.11	0.96	-0.26**	0.10	0.77
Schooling experiences															
Career counseling	0.08	0.16	1.08	-0.07	0.17	0.93	-0.01	0.13	0.99	-0.11	0.19	0.90	-0.04	0.18	0.96
Career exploration	-0.26	0.23	0.77	0.02	0.24	1.03	-0.11	0.18	0.89	0.24	0.24	1.27	0.19	0.19	1.21
Academic self-concept	0.67***	0.13	1.96	0.57***	0.16	1.78	0.50***	0.10	1.64	0.04	0.11	1.04	-0.28**	0.08	0.76
School valuing	0.51***	0.11	1.67	0.52***	0.14	1.68	0.27**	0.10	1.32	0.23	0.14	1.26	0.21*	0.09	1.23
School belonging	0.39**	0.15	1.48	0.06	0.16	1.07	0.41***	0.12	1.51	-0.24	0.18	0.79	-0.02	0.11	0.98
High School Program															
General (ref)															
College	0.42	0.27	1.52	0.56*	0.28	1.75	0.12	0.24	1.13	-0.90†	0.52	0.40	-0.21	0.32	0.81
Vocational	-0.66	0.50	0.52	-0.45	0.59	0.64	-0.09	0.38	0.92	0.43	0.45	1.53	0.33	0.34	1.40
Don't know	-0.04	0.36	0.96	0.02	0.38	1.02	-0.79*	0.33	0.45	0.29	0.35	1.34	-0.20	0.29	0.82
Intercept	-7.24***	1.06	-	-6.66***	0.95	-	-4.79***	0.67	-	-2.21**	0.81	-	0.31	0.57	-
Log pseudo likelihood[a]	-2483.88														
Pseudo R^{2a}	0.11														
N	1642														

a. Fit statistics based on one complete and imputed data set.

*** $p < .001$ ** $p < .01$ * $p < .05$ † $p < .10$ (two-tailed test)

Table 17

Multinomial Logistic Regression Results Predicting Group Membership with Multiple-Disadvantage Cluster as Reference Group

	Reference Group: Multiple Disadvantage														
	Ambitious			Persistent			Well Rounded			Average			Work Focused		
Variables	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR
Background characteristics															
Gender (female)	0.83***	0.22	2.28	0.97***	0.26	2.64	0.51*	0.21	1.66	-0.02	0.20	0.98	-0.25	0.23	0.78
Race/Ethnicity															
White (ref)															
African American	-0.17	0.37	0.84	0.04	0.46	1.04	-0.16	0.38	0.85	-0.27	0.63	0.76	0.29	0.54	1.34
Hispanic	0.27	0.23	1.31	-0.14	0.23	0.87	-0.04	0.24	0.96	-0.15	0.31	0.86	-0.05	0.26	0.95
Other	0.50	0.33	1.65	0.44	0.34	1.55	0.23	0.26	1.26	0.47	0.32	1.59	0.53*	0.27	1.70
Locale															
Small town (ref)															
Rural fringe/distant	0.07	0.26	1.07	-0.11	0.29	0.89	0.12	0.24	1.13	-0.22	0.31	0.80	-0.18	0.27	0.84
Rural remote	-0.23	0.25	0.79	-0.30	0.25	0.74	-0.08	0.25	0.93	-0.32	0.30	0.72	-0.60**	0.23	0.55
Perceived hardship															
Positive job perceptions	-0.19	0.12	0.83	-0.28*	0.11	0.75	0.02	0.09	1.02	-0.07	0.12	0.93	0.12	0.10	1.13
Educational barriers	-0.32*	0.15	0.72	0.01	0.16	1.01	-0.31*	0.13	0.74	-0.38**	0.12	0.68	-0.09	0.12	0.91
Occupational barriers	0.06	0.13	1.06	0.04	0.13	1.04	0.04	0.11	1.04	0.04	0.11	1.04	-0.22*	0.10	0.80
Schooling experiences															
Career counseling	0.19	0.15	1.21	0.03	0.19	1.03	0.10	0.14	1.10	0.11	0.19	1.11	0.07	0.17	1.07
Career exploration	-0.50*	0.22	0.61	-0.21	0.24	0.81	-0.35*	0.18	0.70	-0.24	0.24	0.79	-0.05	0.18	0.95
Academic self-concept	0.63***	0.14	1.88	0.54**	0.15	1.71	0.46***	0.12	1.58	-0.04	0.11	0.96	-0.32**	0.09	0.73
School valuing	0.28*	0.13	1.32	0.28	0.17	1.33	0.04	0.13	1.04	-0.23	0.14	0.79	-0.02	0.13	0.98
School belonging	0.63**	0.18	1.88	0.30†	0.17	1.35	0.65***	0.16	1.91	0.24	0.18	1.27	0.22	0.16	1.25
High School Program															
General (ref)															
College	1.32**	0.50	3.76	1.46**	0.51	4.32	1.02*	0.43	2.78	0.90†	0.52	2.47	0.70	0.48	2.00
Vocational	-1.09**	0.41	0.34	-0.88†	0.47	0.42	-0.51	0.31	0.60	-0.43	0.45	0.65	-0.09	0.31	0.91
Don't know	-0.33	0.25	0.72	-0.27	0.36	0.77	-1.08***	0.28	0.34	-0.29	0.35	0.75	-0.50*	0.25	0.61
Intercept	-5.03***	0.92	-	-4.45***	0.80	-	-2.58***	0.68	-	2.21**	0.81	-	2.52***	0.66	-
Log pseudo likelihood[a]	-2483.88														
Pseudo R^{2a}	0.11														
N	1642														

a. Fit statistics based on one complete and imputed data set.

*** $p < .001$ ** $p < .01$ * $p < .05$ † $p < .10$ (two-tailed test)

Table 18

Multinomial Logistic Regression Results Predicting Group Membership with Work-Focused Cluster as Reference Group

	Reference Group: Work Focused														
	Ambitious			Persistent			Well Rounded			Average			Multiple Disadvantage		
Variables	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR	B	SE	OR
Background characteristics															
Gender (female)	1.08***	0.19	2.94	1.22***	0.21	3.39	0.76***	0.13	2.13	0.23	0.17	1.26	0.25	0.23	1.29
Race/Ethnicity															
White (ref)															
African American	-0.46	0.44	0.63	-0.25	0.48	0.78	-0.46	0.40	0.63	-0.57	0.38	0.57	-0.29	0.54	0.75
Hispanic	0.32	0.24	1.38	-0.09	0.25	0.91	0.01	0.26	1.01	-0.10	0.31	0.91	0.05	0.26	1.05
Other	-0.03	0.23	0.97	-0.09	0.26	0.91	-0.30	0.23	0.74	-0.07	0.24	0.93	-0.53*	0.27	0.59
Locale															
Small town (ref)															
Rural fringe/distant	0.25	0.29	1.28	0.07	0.30	1.07	0.30	0.25	1.34	-0.04	0.25	0.96	0.18	0.27	1.19
Rural remote	0.37	0.28	1.44	0.30	0.29	1.35	0.52*	0.24	1.68	0.27	0.20	1.31	0.60**	0.23	1.81
Perceived hardship															
Positive job perceptions	-0.31**	0.10	0.73	-0.40***	0.10	0.67	-0.11	0.08	0.90	-0.19†	0.10	0.82	-0.12	0.10	0.89
Educational barriers	-0.23*	0.09	0.79	0.11	0.12	1.11	-0.21*	0.09	0.81	-0.29**	0.11	0.75	0.09	0.12	1.10
Occupational barriers	0.28**	0.09	1.33	0.26*	0.11	1.30	0.26**	0.08	1.30	0.26**	0.10	1.30	0.22*	0.10	1.25
Schooling experiences															
Career counseling	0.12	0.16	1.13	-0.04	0.19	0.97	0.03	0.15	1.03	0.04	0.18	1.04	-0.07	0.17	0.93
Career exploration	-0.45*	0.20	0.64	-0.16	0.21	0.85	-0.30*	0.15	0.74	-0.19	0.19	0.83	0.05	0.18	1.05
Academic self-concept	0.95***	0.14	2.58	0.85***	0.16	2.34	0.77***	0.10	2.16	0.28**	0.08	1.32	0.32**	0.09	1.37
School valuing	0.31**	0.10	1.36	0.31**	0.12	1.36	0.07	0.10	1.07	-0.21*	0.09	0.81	0.02	0.13	1.02
School belonging	0.41**	0.14	1.51	0.08	0.14	1.08	0.43***	0.11	1.54	0.02	0.11	1.02	-0.22	0.16	0.80
High School Program															
General (ref)															
College	0.63*	0.31	1.87	0.77*	0.32	2.15	0.33	0.27	1.39	0.21	0.32	1.23	-0.70	0.48	0.50
Vocational	-0.99*	0.39	0.37	-0.78†	0.42	0.46	-0.42†	0.25	0.66	-0.33	0.34	0.72	0.09	0.31	1.10
Don't know	0.17	0.31	1.18	0.23	0.34	1.26	-0.59*	0.28	0.56	0.20	0.29	1.23	0.50*	0.25	1.64
Intercept	-7.55***	0.89	-	-6.97***	0.83	-	-5.1***	0.58	-	-0.31	0.57	-	-2.52***	0.66	-
Log pseudo likelihood[a]	-2483.88														
Pseudo R^{2a}	0.11														
N	1642														

a. Fit statistics based on one complete and imputed data set.

*** $p < .001$ ** $p < .01$ * $p < .05$ † $p < .10$ (two-tailed test)

CHAPTER 5: DISCUSSION

Using Bronfenbrenner's bioecological model and person-oriented analysis as a guiding conceptual framework, this study was designed to explore the schooling experiences of a large national sample of rural work-bound youth. Although scholars have pointed out that work-bound youth are a diverse population, such diversity is seldom explored empirically (Burnell, 2003; Hamilton & Hamilton, 2006; Herr & Niles, 1997; Juntunen & Wettersten, 2005). Results contribute to the literature in a number of ways. First, results suggest that a more complex perspective is gained by identifying and exploring subgroups of work-bound youth over approaches that treat these youth as homogenous (e.g., Rojewski & Kim, 1999). Second, this study design allows for more direct comparisons of subgroups of work-bound youth than is possible across studies. Finally, results inform the literature by demonstrating that work-bound youth differ in their schooling experiences, which may inform interventions designed for these youth specifically. Additionally findings from this study support the bioecological model's emphasis on understanding how the resources, dispositions, and demand characteristics of the individual differentially influences his or her perceptions of school and engagement in schooling experiences that can promote more positive STW transitions.

In the next sections, I highlight some overall findings followed by a discussion organized around each research question. This includes identifying the clusters followed by an examination of cluster differences on demographic characteristics, school location, educational and occupational barriers and opportunities, and schooling experiences. My goal is to discuss

contributions of the study in the context of prior research on work-bound youth. I conclude with a discussion of study limitations and implications for future research and practice.

Overall Findings

The goal of this study was to investigate group differences among rural work-bound youth, but one overall finding should be discussed before moving to the clustering results. Prior studies have documented increasing educational aspirations of recent cohorts of youth, including rural youth, youth of color, and low-income youth (Goyette, 2008; Meece et al., 2013; Reynolds, 2006; Schneider & Stevenson, 1999). This study extends this finding to rural work-bound youth given that the sample as a whole had high educational aspirations.

Yet findings raise the question of why these youth did not attain a credential given that aspirations predict attainment (Bandura et al., 2001). Two studies, using RHSA data, may partially address this inconsistency. Meece and colleagues (2013) found that although rural youth had high aspirations, approximately 50% of the sample had educational aspirations that exceeded what was necessary for their desired jobs. Although this is not unreasonable, approximately 18% of the sample held educational aspirations that far exceeded what was necessary, suggesting that some youth may hold unrealistic expectations or lack information to inform their futures (Robst, 2007; Schneider & Stevenson, 1999). Support for this hypothesis comes from findings that rising aspirations of recent cohorts of youth are less predictive of attainment compared to previous cohorts (Byun et al., 2017; Goyette, 2008; Schneider & Stevenson, 1999).

Work by Hutchins and colleagues (2012) suggests a second possibility. These authors found that although approximately 90% of rural youth expected to continue their education at some point, 38% of these youth planned to work first.[44] Youth who take a break from school, particularly those who experience economic hardship or problems in school, are less likely to

[44] This finding was replicated in the current study for work-bound youth specifically (see Table 1).

return and graduate (Bozick, 2007; Bozick & DeLuca, 2005; Mortimer, 2010). Rural youth are more likely to delay PSE entry, and are less likely to be continuously enrolled compared to urban youth (Byun et al., 2015). More research is needed to address why rural work-bound youth with high aspirations, particularly those who report low family hardship, do not attempt or attain PSE.

Research Question 1

A primary goal of this study was to ascertain whether cluster analysis results were meaningful without being reductionist, given the diversity within this population (Juntunen & Wettersten, 2005). To be meaningful, results needed to be reliable, valid, and useful in differentiating groups on study variables given that cluster analysis invariably results in cluster solutions even when no true clusters exist (Pastor, 2010). One difficulty in evaluating whether this goal was accomplished is the lack of similar studies for comparison. Given the lack of guiding research in this area, it is important to briefly evaluate the overall quality of the final cluster solution in relation to the literature before discussing findings around particular groups.

The final cluster solution explained 54% of the variance among cluster variables, which is lower than the 67% suggested by Bergman and colleagues (2003). However, a review of the literature suggested that solutions with explained variance around 50% are common (e.g., Conley, 2011; Mueller & Elder, 2003; Peck, Vida, & Eccles, 2008; Smith, Peck, Denault, Blazevski, & Akiva, 2010; Zarret & Eccles, 2009).[45] In terms of cluster quality, groups evidenced good between-group separation on most variables, but some clusters evidenced more within-group homogeneity than other. For example, the *well-rounded* and *work-focused* clusters were the most homogenous (homogeneity coefficient = .67 and .73, respectively), whereas the *average* cluster was the least homogenous (1.31). Homogeneity coefficients ≤ 1.0 are considered

[45] In fact, a number of prominent clustering studies are based on solutions with low explained variance (e.g., 33.8%, Bartko & Eccles, 2003; 40%, Mahoney, 2000) and some authors do not report variance explained (e.g., Estell et al., 2007; Farmer, Leung, Weiss, Irvin, Meece, & Hutchins, 2011).

generally acceptable (Bergman et al., 2003). However, reliability and validity analyses indicated that the clusters were reproducible and that teachers generally reported patterns of educational expectations and academic achievement that separated most groups.

In terms of cluster characteristics, this study contributes to the literature by identifying groups that are consistent with, but also challenge, conceptualizations of rural work-bound youth found in the literature. Next, I will summarize how cluster results add to, or challenge, the literature on work-bound youth. I will make some cluster comparisons here, much of the comparative evaluation will occur as I address findings from subsequent research question as the incorporation of additional variables allows for a fuller comparison of the clusters.

The identification of the *ambitious* group adds to the literature because few studies characterize rural work-bound youth as having such high educational and occupational aspirations. This may explain why these youth did not attain a PSE credential. Some youth overestimate their qualifications to undertake college-level work as they do not see connections between high school performance and later academic performance (Goyette, 2008; Reynolds et al., 2006).[46] These unrealistic beliefs may be due to lack of information. Although this study does not address whether these youth had unrealistic aspirations, the fact that teachers reported similar educational expectations and achievement to the *well-rounded* youth suggests that these youth may represent what some have called "drifting dreamers" (Schneider & Stevenson, 1999). These are youth who hold lofty dreams, but lack the ability or knowledge to realize their dreams.

The identification of the *persistent* group is interesting in that they hold high aspirations despite family hardship. They are similar to the *economically-constrained* youth identified by Bozick and DeLuca (2011), but the *persistent* youth held much higher educational aspirations. Despite this inconsistency, the identification of this group is not surprising given that increasing

[46] Rosenbaum (1998) refers to such views as "no penalty beliefs."

numbers of low-income youth are aspiring to PSE, particularly those who have adults who hold high expectations for their children's futures (Bryan, Holcomb-McCoy, Moore-Thomas, & Day-Vines, 2009; Ceja, 2004; Cook, Herman, Phillips, & Settersten, 2002; Zarate & Gallimore, 2005). This study extends this finding to rural work-bound youth. In terms of why these youth did not attain a credential, the literature suggests that these youth, even if college qualified, often fail to meet college readiness milestones (e.g., taking entrance exams, completing applications) and that family hardship is often to blame (ACT, 2016; Hahn & Price, 2008; Perna, 2010).

One observation about this group suggests an area for future study. At the group level, *persistent* youth evidenced potential misalignment between their educational and occupational aspirations. Although not evaluated empirically, findings suggest that *persistent* youth aspire to attain more education than is typically required for their aspired occupations. The literature suggests that those youth who hold misaligned educational and occupational aspirations may do so because they lack access to resources and opportunities that can help them form more realistic expectations about their futures (Schneider & Stevenson, 1999). Support for this interpretation comes from the finding that *persistent* youth reported much higher perceived family hardship than other work-bound groups. These youth may aspire to advanced degrees to overcome economic hardship without understanding the requirements of their desired occupations (Meece et al., 2013; Robst, 2007; Sabates, Harris, & Staff, 2011). However, more research is needed to confirm whether these *persistent* youth indeed have misaligned ambitions and if so, whether this is a result of not understanding the requirements of their desired occupations or whether these high educational aspirations reflect a desire to increase their chances of attaining their desired occupations.

The identification of the *well-rounded* group is consistent with prior research. A number of studies, both quantitative and qualitative, have identified work-oriented youth who experience few hardships and are qualified to attend college, but choose not to (Blustein et al., 2002; Bozick

& DeLuca, 2011; Burnell, 2003; Hahn & Price, 2008). This study did not assess whether these youth were academically prepared for college or actively decided not to continue. However, the identification of this group confirms findings from other studies suggesting that some work-oriented youth have positive academic performance and face little hardship, but still do not complete PSE (Burnell, 2003; Blustein et al., 2002; W. T. Grant Foundation, 1988).

The identification of the *average* group is interesting given that this group had the lowest work orientation of any group. Because the clustering variables do not provide a clear description of these youth beyond low work orientation, I will return to this group as I discuss how these youth differ from others, particularly on schooling experiences. Given that these youth evidence the lowest occupational orientation, but average aspirations and achievement, it may be the case that they are uncertain or ambivalent about their futures based on clustering results and subsequent findings (Schneider & Stevenson, 1999).

The identification of the *work-focused* and *multiple-disadvantage* groups is well supported in the literature. For example, the *work-focused* and *multiple-disadvantage* youth in this study share similarities to Bozick and DeLuca's (2011) *work-driven* and *multiple-disadvantage* youth, respectively. Most importantly, *multiple-disadvantage* youth display patterns that are consistently found among many work-bound youth, including high economic hardship, low aspirations, and poor academic performance (Juntunen & Wettersten, 2005).

Group comparisons will be explored in later sections, but are highlighted here briefly. First, the identification of the *persistent* and *multiple-disadvantage* groups supports an earlier critique of work-bound youth studies that use single dimensions to explore group differences. For example, Blustein and colleagues (2002) explored differences between work-bound youth from high and low socioeconomic status (SES) backgrounds, finding that those from high SES

backgrounds evidenced more positive transition outcomes. Analysis using single factors, such as SES, to compare groups, may be too simplistic given current findings that distinct groups formed within broader SES groups. Second, there has been interest around youth who exhibit profiles of the *well-rounded* youth because they challenge the deficits perspective (Burnell, 2003; Blustein et al., 2002; Hahn & Price, 2008). However, few work-bound youth studies allow for direct comparisons of work oriented, high achieving, and high aspiring youth (i.e., *well rounded*) to work oriented, low achieving, and low aspiring youth (i.e., *work focused*) (e.g., Blustein et al., 1997; 2002). As such, comparisons of these two groups on subsequent aims will be highlighted.

Research Question 2

A second study goal was to evaluate the composition of the clusters in terms of gender and racial and ethnic composition to evaluate whether any demographic groups were overrepresented or underrepresented within clusters. The finding that girls were overrepresented in the *ambitious* and *persistent* groups and underrepresented in the *average*, *multiple-disadvantage*, and *work-focused* groups is consistent with findings that rural girls tend to hold higher educational aspirations and perform better academically than boys (Byun et al., 2012; Elder & Conger 2000; Chenoweth & Galliher, 2004; Meece et al., 2013). Although consistent with previous work on rural youth, this finding is important in establishing a similar pattern of educational aspirations and academic achievement for rural work-bound girls specifically.

One finding that raises questions for future research was that girls were so highly overrepresented (68.6%) in the *persistent* group. One possible explanation may come from work by Meece and colleagues (2014) who examined gender differences on aspirations using the full RHSA sample. One finding was that parents and teachers held higher educational expectations for girls than boys, suggesting that overrepresentation of girls in the *persistent* group may be

related to girls receiving more encouragement from adults to continue their education, which may buffer against perceived hardship. In general, there is a need to explore family supports among different types of work-bound youth, particularly as these supports are strong predictors of aspirations, including for rural work-bound youth (Ali et al., 2005; Deil-Amen & Turley, 2007; Hutchins et al., 2012).

The lack of findings around racial and ethnic group differences is challenging to explain. Although work-bound youth are diverse, youth of color, particularly those who experience family hardship, are often overrepresented among work-bound youth (Herr & Niles, 1997; Rojewski, 1999; Rojewski & Kim, 2003; Juntunen & Wettersten, 2005). However, youth of color have also been found to have high aspirations despite family hardships, particularly among those youth whose parents and teachers hold high expectations for their educational futures (Kao & Thompson, 2003; Mistry, White, Benner, & Huynh, 2009). A challenge in assessing whether the lack of findings would be expected is that few studies have explored aspirations of rural youth of color, particularly interindividual differences among rural work-bound youth of color (Hutchins et al., 2012; Irvin, Byun, Meece, Reed, & Farmer, 2016). Lack of findings may be due to the current study's small sample of African American and Hispanic/Latino youth (6.8% and 11.8%, respectively), which resulted in a lack of power to detect statistically significant differences.

More research is needed to explore the lives of rural youth of color from an ecological perspective given that these youth do not represent a homogenous group in terms of contextual supports, barriers, aspirations, and achievements. For example, Irvin and colleagues (2016) examined school characteristics and schooling experience differences between African American, Hispanic/Latino, and Native American youth from the RHSA study and found that

these groups differ from White youth and from each other in complex ways. Although all groups had high educational aspirations, groups differed on a number of individual, family, school context, and schooling experience factors, suggesting that future research on rural work-bound youth of color should incorporate design elements that allow for more in-depth analysis of differences between racial and ethnic minority groups.

Research Question 3

Given the paucity of research on rural work-bound youth, it was important to explore relations between school context and group differences among these youth. For this analysis, school location (using locale codes) was explored. The lack of findings was not surprising given that the locale codes provide only a broad indication of a school's distance to more populated areas. Although geographic isolation is important, not all isolated rural areas are the same (Arnold, Biscoe, Farmer, Robertson, & Shapley, 2007; Irvin et al., 2011). For example, although a greater proportion of rural youth in geographically isolated communities attend schools where more than 50% of students are eligible for free or reduced-price lunch than the national average, not all isolated schools are impoverished (Provasnik et al., 2007). Rural schools, even within the same locale, may differ in other ways that relate to rural youth's transition pathways such as, proximity to PSE institutions, local economic opportunities, size, demographic composition, or availability of transition programs (Hutchins & Akos, 2013; Irvin et al., 2011).

More work is needed to incorporate additional school context variables into future studies. The decision to not fully explore school context variables in this study was influenced by previous research on RHSA youth who expected to pursue work-bound pathways that showed little indication that contextual variables (proximity to college, school poverty, and school location) predicted group membership (Hutchins et al., 2012). However, given that actual work-

bound pathways are now known, future studies of work-bound youth should further explore school context variables, particularly relations between school poverty and geographic isolation.

Research Question 4

Given that perceived barriers and supports influence transition choices, these factors may provide a clue to why these youth were work bound (Lent et al., 2000). Three findings emerged that contribute to the literature. First, the finding that *work-focused* youth reported the lowest perceived job barriers of any group is consistent with research suggesting that because these youth have lower educational and occupational aspirations, they may perceive fewer job barriers as their aspirations are aligned with available low-skilled jobs in the community (Bozick & DeLuca, 2011; Haller & Virkler, 1993). Also, the finding that *work-focused* youth reported fewer job barriers than the *multiple-disadvantage* youth despite other similarities, supports work by Bozick and DeLuca and Blustein and colleagues (2002) suggesting that youth who enter the workforce, but experience little family hardship, may perceive fewer job barriers because they have greater access to job enhancing resources. Although this finding is consistent with previous work, it has not previously been replicated in a sample of rural work-bound youth.

A second finding with implications for the literature is that the *persistent* youth, and to some degree the *ambitious* youth, were less likely to perceive positive local job opportunities compared to others. This result is consistent with findings that rural youth with high aspirations may feel constrained by limited opportunities in the local community (Johnson, Elder, & Stern, 2005). Those youth who remain in their home communities may lower their aspirations to accommodate these limited opportunities (Crockett et al., 2000). Because these data were collected in high school, we do not know how or if these youth modulated their aspirations or remained in their home communities. Although this finding is consistent with the literature, the

high aspirations and positive achievement of both groups challenge descriptions of work-bound youth found in the literature. Researchers often view rural youth in terms of "achievers" (i.e., high achievers from upper and middle class families who leave the community) and "stayers" (i.e., lower achievers from working-class families who stay in the community) (Carr & Kefalas, 2009; San Antonio, 2016). These results suggest that such dichotomies are problematic. For example, it is unclear if *persistent* or *ambitious* work-bound youth fit neatly into either category given that most aspired to attain professional degrees and had positive academic achievement. Results from this study support the position that rural youth's transition pathways are more complex than is often described in the literature (San Antonio, 2016).

Finally, the finding that the *persistent*, *multiple-disadvantage*, and *work-focused* youth perceived greater educational barriers than the *ambitious*, *well-rounded*, and *average* youth suggests that lack of PSE attainment among these youth may be related to perceived barriers. Results are not surprising given that *persistent* youth reported greater family hardship, *work-focused* youth reported lower grades, and *multiple-disadvantage* youth reported both, but this finding raises questions. Because the barriers scale was not domain specific, it is difficult to attribute specific educational barriers to particular groups. For example, although *work-focused* youth reported lower grades, many low performing youth do not believe that this is an educational barrier (Reynolds et al., 2006). For some work-oriented youth, the assumption of adult responsibilities (e.g., getting married) may be perceived as a greater barrier than academic performance (Burnell, 2003). For example, Garrett and Eccles (2009) identified two types of work-oriented youth who differed in their desire to take on adult responsibilities. Although both groups wanted to work, only one wanted to get married and start a family right after high school.

There is considerable evidence that the educational barriers scale used in this study forms a single dimension, including among samples of rural youth (e.g., Irvin et al., 2011; McWhirter, Rasheed, & Crothers, 2000; McWhirter et al., 2007). However, work by Bozick and DeLuca (2011) suggests that there are interindividual differences among work-bound youth in the types of educational barriers that they report. Although current findings are informative for identifying which subgroups of work-bound youth perceive greater educational barriers, more work is needed to provide a clearer picture of what specific barriers these youth perceive.

Research Question 5

Schooling experiences were conceptualized in two ways: postsecondary transition activities (counseling, exploration, and academic program) and perceptions of school (academic self-concept, school valuing, and school belonging). Findings on each domain will be discussed.

Postsecondary transition activities. The finding that the sample as a whole reported infrequent participation in career counseling and exploration is concerning given that these career supporting activities may uniquely benefit work-bound youth (Neumark, 2007). These findings may be related to program availability as schools are generally more focused on academic preparation over career preparation (Hutchins & Akos, 2013; Joyce & Neumark, 2000; Neumark & Rothstein, 2005; Rosenbaum et al., 2010; Stone & Aliaga, 2007).

In terms of career counseling, the finding that participants received counseling from teachers and counselors around once or twice a year with no group differences detected, is consistent with the literature that high schools generally place less emphasis on career development (Krie & Rosenbaum, 2001; Rosenbaum et al., 2015). Other studies support this finding. For example, Griffin and colleagues (2011), using the full RHSA sample, found that over 50% of students had not talked to a counselor or teacher about their futures. One concern

with this finding is that rural youth may have more limited access to career counseling from counselors who typically serve many students and are often asked to complete non-counseling tasks (Morrissette, 2000; Monteiro-Leitner, Asner-Self, Milde, Leitner, & Skelton, 2006). Such commitments may leave counselors little time to meet with students to discuss their futures.

In terms of career exploration, one new finding emerged. The *ambitious* and *well-rounded* youth were less likely to take part in exploration compared to *multiple-disadvantage* and *work-focused* youth. This finding is important given the lack of research on who takes part in exploration, particularly among rural youth (Hutchins & Akos, 2013; Stone & Aliaga, 2007). Available research suggests few factors predict participation, but there is some evidence that students in vocational and college preparation programs, as well as higher and lower achieving youth, are more likely to participate (Hutchins & Akos, 2013; Visher, Bhandari, & Medrich, 2004). This result appears to conflict with findings that higher achieving youth participate in exploration. However, because *ambitious* and *well-rounded* youth were not compared to college-bound youth, it is challenging to evaluate this discrepancy. This finding suggests that more ambitious work-bound youth who face less family hardship and educational barriers are forgoing exploration, possibly believing they will do so in college. Lower aspiring and achieving youth may believe they are likely to enter the workforce and are exploring their options. However, given the lack of controls for program availability, these results should be replicated.

In terms of course taking, while some group differences emerged, the overall finding that 64% of the sample reported being enrolled in the general education program instead of a specialized program is concerning. This finding is higher than that reported by Rojewski (1999) who found, using a nationally representative sample, that approximately 47% of rural work-bound youth were in a general program. More concerning, approximately 8% of participants in

the current study reported being in a vocational program compared to 23% reported by Rojewski. It should be noted that neither study allowed students to indicate CTE program participation. General education programs typically do not provide specialized education and training that may be particularly beneficial to youth entering the workforce (Neumark, 2007).

Perceptions of school. Students' competency and value beliefs are important aspects of their schooling experiences and robust predictors of academic achievement, aspirations, and planning (Bandura et al., 2001; Eccles et al., 1998). The finding that the *average, multiple-disadvantage*, and *work-focused* youth had the lowest self-concept, while the *ambitious, persistent*, and *well-rounded* youth had the highest, is not surprising given that academic achievement and self-concept are correlated and contribute to one another (Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005; Valentine, DuBois, & Cooper, 2004). Although these results were somewhat expected given group characteristics, two unique findings were uncovered.

First, although *work-focused* youth reported the lowest academic self-concept, the difference between *work-focused* and *well-rounded* youth on school valuing was not statistically significant. Studies on high achieving, work-oriented youth who face little hardship suggest that these youth value school despite not continuing their education beyond high school (Burnell, 2003; Hahn & Price, 2008). This finding implies that more academically qualified work-oriented youth value school more than less qualified youth. However, work by Blustein and colleagues (2002) suggests that both high- and low-achieving work-bound youth report similar levels of school valuing despite differences on actual performance. Current findings align with work by Blustein and colleagues, suggesting that most work-bound youth, regardless of performance, understand that education is important for future opportunities (Rosenbaum et al., 2015). However, given differing study methodologies, this finding should be further explored.

Second, although *average* youth generally differed from both high aspiring and achieving (*ambitious, persistent, well-rounded*) and low aspiring and achieving (*multiple disadvantage, work focused*) groups, in terms of competency and value beliefs, *average* youth appeared more similar to the latter groups. For example, in terms of self-concept, they did not differ significantly from *multiple-disadvantage youth*, had only slightly higher self-concept than *work-focused* youth, but had much lower self-concept than *ambitious, persistent* and *well-rounded* youth. However, *average* youth had the lowest school valuing compared to all other groups except *multiple-disadvantage* youth.[47] This and the finding that *average* youth had the lowest occupational orientations, suggest that these youth were particularly at risk of floundering in the transition because of their lower levels of commitment to school and work. Given the exploratory nature of the current study, this suggestion needs further exploration.

In terms of school belonging, one important finding was that *persistent* youth had lower belonging compared to *ambitious* and *well-rounded* youth despite similar patterns of aspirations, grades, academic self-concept, and school valuing. Students from low-income backgrounds often must compete with more advantaged students over resources, particularly when they are outnumbered by more advantaged youth (Mayer, 2002). Also, more economically advantaged youth typically enter school with better prior schooling experiences, greater influence and standing with school staff, and with parents who are better able to advocate on their students' behalf (Entwisle, Alexander, & Olson, 2007). As such, low income youth may experience difficulty adjusting to the school culture, which may lower their sense of belonging (Crosnoe, 2009). This situation is unfortunate because a sense of belonging can serve as a protective factor for students experiencing economic hardship (Finn, 1989; Juvonen, 2006).

[47] The difference between *average* and *multiple-disadvantage* youth was not statistically significant.

This current finding suggests that despite high aspirations and positive academic achievement, *persistent* youth may still experience problems adjusting to the school culture. More work is needed to understand how this lower sense of belonging influences *persistent* youth's schooling experiences compared to other ambitious work-bound youth. It may be that *persistent* youth are overlooked as staff may focus more on improving career and college readiness of lower aspiring and achieving students. *Persistent* youth may receive more monitoring around financial issues (e.g., financial aid), but less attention and monitoring around school adjustment if they are perceived as already having high aspirations and positive achievement.

Study Limitations

I have highlighted limitations throughout the chapter. Here I discuss broad limitations to consider when interpreting findings. First, initial data were collected near the onset of the Great Recession, which may have uniquely impacted PSE transition patterns and thus the generalizability of the results. Research has indicated that fewer low-income youth enrolled in PSE at the onset of the recession compared to prior cohorts (Shapiro et al., 2015). Second, given the exploratory nature of this study, few contextual factors were used in analysis despite the fact that rural communities are economically, socially, and politically diverse (Coladarci, 2007; Johnson & Strange, 2007). Third, because the study only included rural youth, it was not possible to explore rural-nonrural differences on study outcomes. In addition, although the RHSA study provides schooling experience data not found in other datasets, the primary data source was a student survey which raises issues of shared method variance. Relatedly, because the study was not designed specifically for work-bound youth, data with particular salience for these youth were not collected, including: participants' work experience, desire to enter the

workforce, and self-reported reasons for not completing PSE (Bozick & DeLuca, 2011; Staff et al., 2010).

An additional limitation is that college-bound youth were not included in this analysis. This was done to focus on differentiating subgroups of work-bound youth instead of focusing on differences between work-bound and college-bound youth. An important next step would be to explore how the identified work-bound groups differ from college-bound youth, particularly to determine if some work-bound groups share characteristics with PSE attainers, particularly two-year degree attainers, to better understand why some work-bound youth do not attain PSE.

A final limitation is that some participants may have completed a PSE credential, which was not detected by the StudentTracker (see Appendix C). Efforts were undertaken to reduce the number of false negative cases in the sample. However, some sources of measurement error were beyond the control of the RHSA investigators (e.g., institutional coverage, suppressed records). Although StudentTracker results may slightly underestimate the number of RHSA youth enrolled in PSE institutions, it is important to point out that most approaches used to obtain PSE outcome information (including self-report) include measurement error in some form.

Implications for Research, Policy, and Practice

This study adds to the rural education literature in a number of ways which have been discussed in relation to specific findings. Here I suggest three critical and overarching areas for future research. First, more work is needed to understand how rural work-bound youth themselves conceptualize the transition to adulthood, particularly the role that families, schools, and communities play. There is a need to address this issue with both quantitative and qualitative studies. Quantitative studies can uncover unique relations among individual and contextual variables that serve to promote or constrain the transition experiences of work-bound youth, but

quantitative studies often lack the depth to address this complex transition experience. Qualitative studies can provide a more nuanced perspective by lending voice to rural work-bound youth themselves (e.g., Burnell, 2003; San Antonio, 2016).

Second, future studies should include additional family, school, and rural community context variables to further clarify current findings. In terms of family context, family supports and parents' level of education should be incorporated into future work as these factors can protect against other contextual barriers and have been shown to influence students' aspirations and attainment (Ali et al., 2005; Meece et al., 2010). With regard to schooling experiences, there is a need to understand interindividual differences among work-bound youth on specific PSE and career preparation activities, such as coursework participation, completing college entrance exams, completing financial aid, and taking part in college/career enhancing programs, to better understand which work-bound youth are further along in their college and/or career readiness (Hahn & Price, 2008). In terms of school and community contextual factors, future studies should explore issues of program availability, school poverty, and local economic conditions.

Third, future studies should include more nuanced indicators related to students' barriers and schooling experiences. Because the RHSA study was designed to assess a broad range of constructs, some indicators may not have captured adequate variance in students' experiences. For example, the educational and occupational barriers scales provided information on the overall magnitude of perceived barriers, but did not provide domain specific information. In addition, the occupational orientation scale in the cluster analysis was used as a proxy for desire to work, but the items may have been more related to a desire for *quality* work (e.g., "get a good job") than a general desire to work, which is an important factor in the work-bound literature

(Herr & Niles, 1997). Given the role of work in the lives of these youth, future studies should include measures of work desire, work experience, and work duration (Staff et al., 2010).

This study was designed to generate knowledge to help rural educators and policymakers develop programs to meet the needs of work-bound youth. Results illustrate that work-bound youth are diverse and that intervention efforts may be thwarted if their diverse goals, aspirations, and needs are not addressed. Results suggest three areas of consideration for practitioners. First, results suggest it is problematic to think about all work-bound youth from a deficits perspective. Some identified groups were characterized by high aspirations, positive academic performance, and little perceived hardship. Some students who did evidence deficits, such as the *work-focused* youth, also experienced little family hardship, had positive views around local job opportunities, and had taken part in more career exploration compared to some of the more ambitious and higher achieving groups. In short, helping professionals must be mindful of such diversity and consider ways of building on the strengths of these youth.

Second, efforts to improve PSE outcomes must target the unique needs of the individual student. For example, *ambitious* and *persistent* work-bound youth may not benefit from efforts to increase aspirations, but may benefit from formal career exploration to increase their chances of meeting their high aspirations (Rosenbaum et al., 2015). *Persistent* youth may benefit from efforts to support school adjustment in addition to financial counseling around PSE to help these youth remain academically engaged in school. *Average, multiple-disadvantage*, and *work-focused* youth, may benefit from opportunities to take part in college courses (particularly in CTE areas) in high school to better prepare for the transition to work (Rosenbaum et al., 2015). Such exposure may connect these youth to opportunities and pathways that allow them to develop specialized skills that can improve their transition outcomes (Carnevale et al., 2016).

Finally, from a policy perspective, results serve as a reminder that rural work-bound youth have different educational and occupational goals that require moving beyond a one-size-fits-all approach. There is a critical need for programs and services that expose these youth to multiple pathways and opportunities to protect against floundering. However, study results indicate that rural youth, like many other high school graduates, often leave school without exposure to information that can inform their college and careers aspirations or provide tangible skills for the workforce (Carnevale et al., 2016). High schools are in a unique position to improve the academic engagement of work-bound youth by providing educational and career enhancing opportunities (e.g., dual enrollment courses, internships, mentorships, etc.). However, work-bound youth may resist these efforts if they believe that the services do not take into account their goals, aspirations, and interests (Burnell, 2003; San Antonio, 2016).

Conclusion

Results from this study challenge the conceptualization of rural work-bound youth in simple dichotomies or comparative terms (e.g., college vs. work bound, achievers vs. stayers) (Rojewski, 1999; San Antonio, 2016). Although these youth are diverse in terms of aspirations, achievements, goals, and experiences, much can be learned from using person-oriented analysis to explore group differences without being reductionist. Findings highlight that not all rural work-bound youth experience economic hardship, low aspirations, and problematic schooling experiences. The finding that most youth aspired to postsecondary education, despite not attaining a credential, supports a growing concern among scholars that efforts to increase youth's aspirations may not be sufficient and in some cases may have negative consequences if these youth do not receive adequate preparation to meet their aspirations (Dietrich et al., 2009; Meece et al., 2013; Rosenbaum et al, 2015; Schneider & Stevenson, 1999). It was beyond the scope of

this study to determine whether these youth were prepared academically, but results do indicate that many of these youth left high school without taking part in programs and services that promote college and career development.

Despite these results, the reality remains that attaining a postsecondary credential remains one of the best ways to ensure that youth do not flounder in the transition to adulthood (Carnevale et al., 2016). For many work-bound youth, high school provides the last opportunity for exposure to formal career informing and enhancing opportunities that can promote better postsecondary education outcomes. Results of this and other studies suggest that schools have room to grow in providing such opportunities, but efforts may be met with limited success if work-bound youth are exposed to limited options. Work-bound youth may benefit from a number of opportunities, particularly greater access to college courses (particularly vocational and CTE courses) and services that help these youth develop more personalized college and career pathways. Although creating such services comes at great cost to rural schools, investments in targeted services may pay off in terms of work-bound youth finding pathways that improve the chances of a more stable transition to the workforce, which in turn supports economic growth in the local rural community.

APPENDIX A: SUMMARY OF RHSA STUDIES CITED IN THIS DISSERTATION

Given the number of studies cited that used the RHSA data for analysis, a table was created to provide the reader with additional summary information about each RHSA study and main findings. Only studies that used the RHSA dataset are included in this table. Much of the summary information provided here comes from published abstracts, with slight modifications by the current study author.

Reference	Summary of findings
Byun, S., Meece, J. L., & Agger, C. A. (2017). Predictors of college attendance patterns of rural youth. *Research in Higher Education*, 1-26. First online edition.	This study investigated patterns of college attendance using data from students in grades 11 and 12 during the initial RHSA study. Investigators found that more than half of rural youth attended two-year institutions at some point during their college career and about a fourth initially enrolled in a two-year college before enrolling in a four-year college. Results also revealed that parental education, college preparatory track and preparation experiences, and teacher expectations predicted students' college attendance patterns. Findings point to the importance of two-year colleges and highlight the influence of family characteristics and students' schooling experiences in the postsecondary trajectories of rural youth.
Farmer, T. W., Leung, M. C., Weiss, M. P., Irvin, M. J., Meece, J. L., & Hutchins, B. C. (2011). Social network placement of rural secondary students with disabilities: Affiliation and centrality. *Exceptional Children*, *78*(1), 24-38.	This study examined social network centrality (i.e., social salience, peer group linkages) and peer affiliations in a subsample of 20 RHSA high schools. The total sample consisted of 1,672 students in grades 9 to 12, including 164 students with disabilities (69 females). In comparison to their peers without disabilities, students with disabilities were more likely to be identified as isolated, peripheral, or secondary in their school social structures. This finding suggested that they had lower levels of social visibility and social connections. Further, peer associates of students with disabilities tended to have less favorable interpersonal characteristics and the peer groups in which they were members tended to be characterized by risk configurations that are associated with poor educational outcomes.
Griffin, D., Hutchins, B. C., & Meece, J. L. (2011). Where do rural high school students go to find information about their futures? *Journal of Counseling & Development, 89*(2), 172-181.	This study examined where students go to receive information about their futures and which sources were most helpful using the full RHSA sample. Results indicated that students in rural and low-income schools were more likely to report going to teachers and found teachers to be most helpful compared with students in small town and higher income schools. Patterns of differentiation were also found on the basis of gender, ethnicity, and grade level.
Hutchins, B. C., Meece, J. L., Byun, S. Y., & Farmer, T. W. (2012). Planning for the future: An investigation of work-bound rural youth. *Rural Educator, 33*(2), 7-19.	This study examined the postsecondary educational and occupational expectations of work-bound rural youth using the full RHSA sample. Three groups of work-bound youth were identified (work-bound only (4.6%), work-bound with future educational plans (33.8%), and work-bound but unsure/undecided about postsecondary education (5.6%)), and

	each group was compared to college-bound (56%) rural youth. Results of multinomial logistic regression analysis indicated that family characteristics and students' schooling experiences were the strongest predictors of work-bound status. Work-bound youth were more likely to report greater family economic hardship, lower parental expectations for completing college, and more negative schooling experiences than college-bound rural youth.
Hutchins, B. C., Meece, J. L., Farmer, T. W., & Irvin, M. J. (2015, April). *Postsecondary education enrollment and completion status among rural college- and work-bound youth: A follow-up investigation from the Rural High School Aspirations Study*. Paper presented at the annual meeting of the American Educational Research Association. Chicago, IL.	This study was a follow up study to the Hutchins et al. (2012) study. In this follow-up study investigators reported on postsecondary education enrollment patterns among the three identified work-bound groups and college-bound youth based on enrollment records obtained from the National Student Clearinghouse. Analysis was restricted to participants who were in grades 11 and 12 during the original study. Results indicated that few work-bound youth in the original study undertook or completed postsecondary education and that enrollment status was related to prior educational and occupational expectations as well other individual, family, school, and schooling experience factors.
Irvin, M. J., Byun, S. Y., Meece, J. L., Farmer, T. W, & Hutchins, B. C. (2012). Educational barriers of rural youth: Relation of individual and contextual difference variables. *Journal of Career Assessment, 20*(1), 71-87.	The purpose of this study was to examine the relation of several individual and contextual difference factors to the perceived educational barriers of rural youth. Results indicated that some individual (e.g., African American race/ethnicity) and contextual (e.g., parent education) difference factors were predictive while others were not. Overall, regression models only explained 5.9% of the variance in perceived educational barriers.
Irvin, M. J., Byun, S. Y., Meece, J. L., Reed, K. S., & Farmer, T. W. (2016). School characteristics and experiences of African American, Hispanic/Latino, and Native American youth in rural communities: Relation to educational aspirations. *Peabody Journal of Education, 91*(2), 176-202.	The primary purpose of this study was to examine differences in the school characteristics and experiences of African American, Hispanic/Latino, and Native American youth in rural high schools as well as their relation to educational aspirations. Authors also investigated the characteristics and experiences of students and their families given that these are important in rural youths' preparation for the transition to adulthood. Descriptive analyses demonstrated there were differences in the school characteristics and experiences of African American, Hispanic/Latino, and Native American youth in rural areas. Regression analyses also showed variations in the predictors of educational aspirations across different racial/ethnic groups.
Irvin, M. J., Meece, J. L., Byun, S. Y., Farmer, T. W., & Hutchins, B. C. (2011). Relationship of school context to rural youth's educational achievement and aspirations. *Journal of Youth and Adolescence, 40*(9), 1225-1242.	The purpose of this study was to investigate the relationship of school characteristics and schooling experiences to the educational achievement and aspirations of youth from high-poverty rural communities. Differences in the relationship of school characteristics and schooling experiences to the educational outcomes of students from high- versus low-poverty rural communities were also examined. Participants included 6,247 students from 43 low-poverty and 21 high-poverty rural communities. After controlling for student and family background, school characteristics (e.g., lower student–teacher ratio) were predictive of achievement for rural youth from high-poverty communities. Schooling experiences (e.g., positive perceptions of their ability, a sense of school valuing and belonging, and preparation for postsecondary education) were predictive of educational achievement and aspirations for rural youth from high- and low-poverty communities.

Meece, J. L., Askew, K. J., Agger, C. A., Hutchins, B. C., & Byun, S. Y. (2014). Familial and economic influences on the gender-related educational and occupational aspirations of rural adolescents. *Journal of Educational and Developmental Psychology*, *4*(1), 238 257.	This study examined how familial, geographic, and economic variables influenced gender-related differences in educational and occupational aspirations. Findings revealed significant gender differences, favoring girls, in youth's educational aspirations, occupational aspirations, and aspirations for nontraditional careers. Results highlight the importance of contextual variables such as parental expectations, family income, and motivation variables in predicting gender-related aspirations of rural youth.
Meece, J. L., Hutchins, B. C., Byun, S. Y., Farmer, T. W., Irvin, M. J., & Weiss, M. (2013). Preparing for adulthood: A recent examination of the alignment of rural youth's future educational and vocational aspirations. *Journal of Educational and Developmental Psychology*, *3*(2), 175-192.	This study presents a contemporary profile of rural youth's educational and vocational aspirations and examines the educational alignment of reported aspirations. This study also examines the role of multiple contexts (family, individual, and school) in explaining variations in rural youth's aspirations. The results indicated that a majority of rural youth wanted to obtain a two- or four-year college degree, and they aspired to adulthood occupations requiring college degrees. More than half of the sample reported misaligned educational and vocational aspirations and patterns of alignment were predicted by family income, student background, geographic isolation, and school-related experiences.
Petrin, R. A., Farmer, T. W., Meece, J. L., & Byun, S. Y. (2011). Interpersonal competence configurations, attachment to community, and residential aspirations of rural adolescents. *Journal of Youth and Adolescence*, *40*, 1091-1105.	This study examined perceptions of community and residential aspirations of RHSA participants in relationship to their competence and risk status in high school. Ratings on participants' school adjustment were provided by teachers. High competence students (i.e., those in configurations of high positive and low negative teacher-rated characteristics) expressed positive perceptions of their rural lifestyle and many, particularly girls, indicated an interest in staying in or returning to their home community. Low competence youth (i.e., those in configurations of low positive and high negative teacher-rated characteristics) appeared to be less connected to their community and were more likely to express their intent to leave and not return.
Petrin, R. A., Schafft, K. A., & Meece, J. L. (2014). Educational sorting and residential aspirations among rural high school students: What are the contributions of schools and educators to rural brain drain? *American Educational Research Journal*, *51*, 294-326.	An extended body of research has documented the outmigration of the "best and brightest" youth from rural areas. Some of this scholarship has suggested that rural schools and educators may be complicit in this process as they devote extra attention and resources to the highest achieving students—those most likely to leave their rural communities after high school. Using the RHSA dataset, study authors found mixed support for this hypothesis. Findings suggest that the highest-achieving rural students were among those with the greatest community attachment, and that student perceptions of local economic conditions were far more influential in shaping postsecondary residential aspirations than the advice of educators, or the poverty level of the school.

APPENDIX B: RHSA FOLLOW UP STUDY STUDENT TRACKER RESULTS

Table 19 is provided to describe differences between the original RHSA sample of 11th and 12th graders submitted to NSC for the PSE enrollment record search (n = 3,456), the follow up sample of found 11th and 12th graders (n = 2,224), and the sample of 11th and 12th graders who were not found in the record search (n = 1,232). The reason for only including students in grades 11 and 12 during the original study here is that these students would have had more time to enroll in a PSE institution after high school as PSE enrollment records were collected five years after the original study. Relatedly, the analytic sample for this study included students in grades 11 and 12 during the original study. It was assumed that when records were not found it was due to non PSE enrollment. However, work by the NSC and others suggest sources of measurement error that result in inaccurate classifications. A detailed discussion of potential sources of measurement error can be found in Appendix C.

Table 19 indicates that 11th and 12th graders with PSE enrollment records differed from those where records were not found in several ways. For the sample where no records where found, there was a higher proportion of male participants compared to the sample where PSE records were found. In addition, the sample where no records were found had a greater proportion of youth of color, were more likely to perceive higher levels of economic hardship at home, were more likely to have parents with lower levels of PSE, performed more poorly in school, had lower levels of school valuing, and had lower educational aspirations and expectations compared to those with PSE records. Also, a greater proportion of sample members whose PSE records were not found reported plans to work directly after high school compared to sample members whose records were found (54.6% vs. 29.3%, respectively). Taken together, these results suggest that the likely reason that records were not found for approximately one-

third of the 11th and 12th graders in the original RHSA study whose records were submitted to the NSC is that these youth did not continue their education at a PSE institution.

Table 19

Comparison of 11th and 12th Grade Students from Original RSHA Sample Where Postsecondary Education Enrollment Records Were Found and Not Found

Variable	Student Record Submitted to NCS	Sample Where Record Was Found	Sample Where Record Was Not Found
	n = 3,456	*n* = 2,224 (64.4)	*n* = 1,232 (35.6)
Gender			
Male	1638 (47.4)	975 (43.8)	663 (53.9)
Female	1815 (52.6)	1249 (56.2)	566 (46.1)
Ethnicity			
White	2379 (69.6)	1609 (72.9)	770 (63.7)
African American	221 (6.5)	127 (5.8)	94 (7.8)
Hispanic/Latino(a)	369 (10.8)	202 (9.1)	167 (13.8)
Other	447 (13.1)	270 (12.2)	177 (14.7)
Family Background			
Parent/Guardians' Highest Level of Education			
HS or Less	1072 (34.3)	628 (30.2)	444 (42.5)
Some PSE/No degree	581 (18.6)	399 (19.2)	182(17.4)
Two-Year College	560 (17.9)	379 (18.2)	181 (17.3)
Four-Year College	538 (17.2)	407 (19.6)	131 (12.5)
Advanced Degree	374 (12.0)	266 (12.8)	108 (10.4)
Perceived Family Economic Hardship*	1.81 (0.95)	1.73 (0.89)	1.94 (1.04)
Academic Achievement/School Valuing			
Teacher-Reported Grades*	5.00 (1.74)	5.40 (1.50)	4.30 (1.80)
Positive School Valuing*	4.24 (1.10)	4.32 (1.05)	4.09 (1.17)
Aspirations and Expectations			
Postsecondary Education Aspirations			
HS or Less	152 (4.4)	22 (1.0)	130 (10.7)
Attend or Complete Two-Year College	491 (14.4)	228 (10.4)	263 (21.7)
Attend or Complete Four-Year College	1293 (38.0)	869 (39.6)	424 (35.1)
Advanced Degree	1277 (20.4)	988 (45.0)	289 (23.9)
Don't Know	193 (5.7)	89 (4.1)	104 (8.6)
Postsecondary Education Expectations			
Percent who plan to continue PSE	3063 (89.6)	2111 (95.7)	952 (78.5)
Work Plans after High School			
Percent who planned to work directly after HS	1289 (38.2)	642 (29.3)	647 (54.6)

Note: *Continuous variable with means and standard deviations reported. All other reported numbers are counts and percent within category.

APPENDIX C: SUMMARY OF NSC STUDENTTRACKER MEASUREMENT ERROR

The NSC has historically provided student PSE outcome information to high schools, employers, the education finance industry, state departments of education, and the U.S. Department of Education. Increasingly, researchers and policymakers are making use of the NSC data via the StudentTracker service for research purposes and to inform policy (see Dynarski, Hemelt, Hyman, 2013; 2015 for a full discussion). The StudentTracker uses a proprietary algorithm to match student search requests to the NSC's database of PSE outcome records. Typically, researchers provide a list of students by name with birth date information, which the algorithm uses to match PSE records to records submitted by the researcher. Currently, NSC provides one of the only means of tracking student-level PSE outcome information for all students attending PSE institutions within the U.S., making it a particularly valuable resource to the student loan industry and more recently academic researchers.

Although the NSC StudentTracker system provides one of the most powerful and comprehensive tools for tracking PSE outcomes at the student level, one potential pitfall with using the NSC data to make inferences about PSE enrollment is that there are several known sources of measurement error that are relevant to estimating PSE outcomes for students. Each source of error results in students who are enrolled in college, but do not appear in the NSC report. In the context of the current study, this means that some members of the analytic sample were enrolled in college or attained a PSE credential and thus were not work bound as defined by this study. Although it is not possible to provide a classification accuracy rate that is specific to the RHSA sample, work by Dynarski and colleagues (2015) and the NSC (2015) provides some indication as to the accuracy of the NSC data.

In particular, Dynarski and colleagues (2012) describe three general sources of error: coverage rates (i.e., percent of schools reporting to the NSC), matching errors, and suppressed records. Taking these three sources of error into account, these authors estimate a general comprehensive coverage rate that is important to acknowledge for anyone making use of the NSC data.

Coverage rate is the percent of PSE institutions that report enrollment information to the NSC. Dynarski and colleagues estimate the current overall coverage rate at 91.6%.[48] However, there is considerable variance within this rate as over 99% of public 4-year institutions and 96% of public 2-year institutions report to the NSC, respectively. The coverage rate is slightly lower for private, non-profit 4-year institutions (93.1%), but much lower for private, for profit institutions (47.9%).[49] Matching errors are errors that occur when records submitted to NSC contain typos or inconsistencies. Dynarski and colleagues do not report matching error rates in their work, but they do report that the algorithm NSC uses to match records is robust to minor typographical errors (e.g., misspelled name or using a nickname such as Chris instead of Christopher) as long as name and birth date information is not missing. Finally, suppressed records are records that have been purposely withheld from NSC at the student's request. This is most often the result of a student requesting a Family Educational Rights and Privacy Act (FERPA) block on his or her records. NSC (2015) indicates that this block rate is relatively low, with the average block rate across the three recent academic years (2010-11; 12-13; 14-15) to be 4.29%. This rate varied by institution type with block rates being slightly higher at two-year institutions (5.3%) compared to four-year institutions (3.3%). Also, the block rate tended to vary

[48] As of 2011. NSC reports a coverage rate of 93%.

[49] Although for profit institutions have the lowest coverage rates, it should be stressed that these institutions enroll a relatively small proportion of the PSE student population (9%) (Ackerman, Cronin, Turner, & Bershadker, 2011).

in terms of students' ethnicity with White and African American students having lower block rates (2.5% and 2.7%, respectively) compared to American Indian and Hispanic/Latino students (5.2% and 4.7%, respectively).

Based on these three sources of measurement error reported, Dynarski and colleagues (2015) estimate an overall comprehensive coverage rate of 86.1% for the NSC student records. The reader should keep in mind that this comprehensive coverage range may not be accurate for the RHSA sample. For example, the coverage rate may be higher for this group because students were asked to provide their own name and birth date information which may be more accurate than administrative records. In addition, because student records were only obtained at one time point the problem of inconsistent administrative records is removed (at least on the researcher's side). Also, because the sample contained fewer youth of color it may be the case the record blocking rates were lower for the RHSA sample. Finally, it may be the case that few RHSA students attended for-profit universities, which tend to have much lower coverage rates than public and non-profit, private institutions. However, such suggestions are speculative. The point here is to acknowledge that while the NSC data are an important source of information on students' PSE outcomes, this source does tend to underreport the number of students seeking PSE and thus the current analytic sample most likely contains students who were not accurately identified as current college attendees or graduates.

APPENDIX D: CLUSTER RELIABILITY AND VALIDITY STUDY

The reliability, or stability, of the final cluster solution was assessed using a cluster replication procedure suggested by Bergman and colleagues. Following these guidelines, a random two-thirds sample of 1104 work-bound youth were selected from the full sample of 1,655 work-bound youth (using the RANDOM program) to submit to the two step clustering procedure used with the full sample. Before conducting the cluster analysis, the reliability sample was compared to the full sample on all five clustering variables with no statistically significant differences detected. All decision rules used for the full sample were used to evaluate findings with the reliability sample (see discussion of decision rules in Chapter 3).

First, the reliability sample was submitted to hierarchical clustering. Inspection of the clustering coefficients (Figure 6) indicated a sharp rise in ESS between cluster 5 and cluster 4, suggesting that a four cluster solution would result in considerable information loss. In comparing these results to the results from the full sample, it should be noted that visual inspection of the plotted clustering coefficients with the full sample suggested a sharp rise between the 5 and 6 cluster solution (see Figure 6).

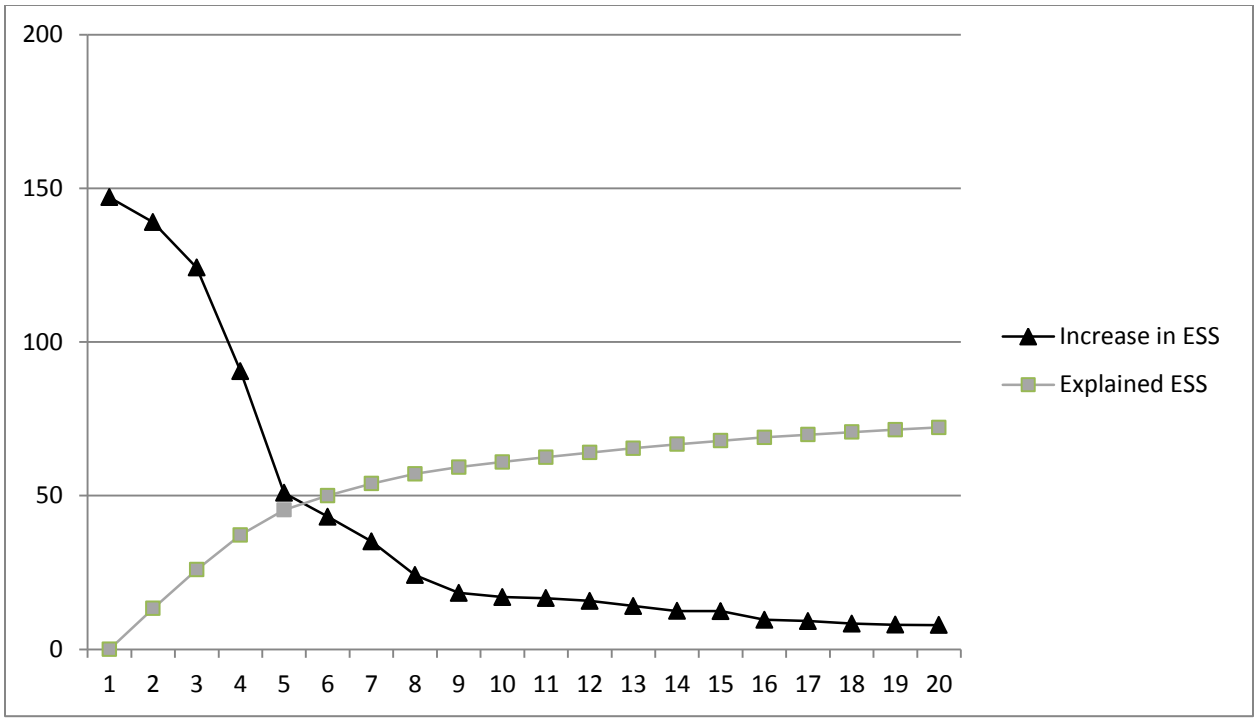

Figure 6. Error sum of squares (ESS) plot for work-bound youth clusters using reliability sample.

Based on these results, the 5- and 6-cluster solution using the reliability sample was examined further. Inspection of the two cluster solutions suggests similar patterns of outcomes to the full sample. In addition, similar to the full sample analysis, the 5-cluster solution with the reliability sample resulted in the fusion of two clusters that were high on perceived hardship, but evidence dissimilar patterns on all other clustering variables. Although moving from the 6- to 5-cluster solution results in a small loss in Explained ESS (50.01% to 46.4%) this loss in explained variance occurs as the result of the fusion of two theoretically distinct clusters.

Given this similar pattern of findings to the full sample analysis, the 6-cluster solution was submitted to k-means clustering using the RELOCATE program to improve cluster fit and to provide the final cluster solution to compare to the full sample. Results of k-mean relocation resulted in the relocation of 213 (19.3%) members to new clusters, which was less than the

percent of members relocated from the full sample (32.4%). Relocation resulted in an improved Explained ESS of 4.01%.

Inspection of the cluster means in Table 20 suggests that the final 6-cluster solution using the reliability sample produced similar clusters compared to the full sample.

Table 20

Means and Standard Deviations for Full and Reliability Sample

	K-Means (Final) Cluster Results with Full Analytic Sample						
Variable	Sample	Ambitious	Persistent	Well Rounded	Average	Multiple Disadvantage	Work Focused
N (%)	1655 (100%)	243 (14.7%)	175 (10.6%)	515 (31.1%)	191 (11.5%)	157 (9.5%)	374 (22.6%)
Homogeneity Coefficient	2.00	1.19	1.08	0.67	1.31	1.12	0.73
Education Aspirations	16.25 (2.86)	19.76 (2.59)	17.95 (2.46)	16.35 (2.19)	14.89 (2.00)	14.06 (1.83)	14.65 (2.02)
Occupation Aspirations	15.22 (2.75)	19.94 (2.24)	15.81 (2.05)	14.62 (1.66)	14.39 (1.91)	13.60 (1.61)	13.83 (1.73)
Occupation Orientation	5.64 (0.51)	5.75 (0.37)	5.71 (0.34)	5.84 (0.24)	4.60 (0.51)	5.58 (0.43)	5.80 (0.28)
Family Hardship	1.86 (0.99)	1.46 (0.58)	3.54 (0.72)	1.43 (0.48)	1.57 (0.54)	3.44 (0.76)	1.41 (0.43)
Academic Achievement	6.12 (1.49)	6.78 (1.18)	6.85 (0.98)	7.08 (0.76)	6.03 (1.48)	4.99 (1.30)	4.52 (0.99)
	K-Means (Final) Cluster Results with Reliability Sample						
N (%)	1104 (100%)	127 (11.5%)	109 (9.9%)	363 (32.9%)	143 (12.9%)	116 (10.5%)	246 (22.3%)
Homogeneity Coefficient	2.00	1.28	1.04	0.68	1.33	1.16	0.70
Education Aspirations	16.28 (2.86)	19.87 (2.84)	18.39 (2.46)	16.71 (2.23)	14.56 (1.92)	14.31 (1.84)	14.78 (2.04)
Occupation Aspirations	15.29 (2.73)	20.68 (1.99)	15.83 (1.97)	14.82 (1.71)	14.22 (1.82)	13.83 (1.66)	13.81 (1.72)
Occupation Orientation	5.64 (0.51)	5.70 (0.58)	5.70 (0.35)	5.86 (0.22)	4.70 (0.54)	5.60 (0.42)	5.83 (0.24)
Family Hardship	1.86 (0.99)	1.54 (0.60)	3.35 (0.67)	1.41 (0.46)	1.57 (0.56)	3.57 (0.82)	1.40 (0.43)
Academic Achievement	6.11 (1.44)	6.54 (1.21)	6.89 (0.93)	7.10 (0.77)	6.06 (1.42)	5.05 (1.24)	4.61 (0.93)

As an added step, both cluster solutions were submitted to the CENTROID program. The CENTROID program compares cluster centroids between the two solutions. Clusters are paired in ascending order based Average Squared Euclidian Distance (ASED) between the two cluster

solutions. Bergman and colleagues (2003) suggest that an ASED below 1.0 is evidence of cluster pairs that are highly similar. Results from the CENTROID procedure (Table 21) indicated that all six clusters met the ASED threshold suggested by Bergman and colleagues.

Table 21

Cluster Centroid Comparison Between Full and Reliability Sample

Cluster Pairs		
Full Sample	Reliability Sample	ASED
Work Focused	Work Focused	0.005
Multiple Disadvantaged	Multiple Disadvantaged	0.028
Average	Average	0.030
Well Rounded	Well Rounded	0.034
Persistent	Persistent	0.046
Ambitious	Ambitious	0.125

Note: ASED = Average Squared Euclidian Distance

Finally, when cluster members were compared between the matched pairs of clusters from the CENTROID program, 94.1% of cluster members received the same cluster assignment between the two samples.

Validity of established clusters. The validity of the cluster results was assessed by evaluating teacher reported educational expectations and grades between the clusters. Although teachers reported lower educational expectations and grades than the students themselves, teacher reports by cluster group suggest similar patterns to what was uncovered in the cluster analysis (see Table 22).

In terms of educational expectations, teachers generally reported higher expectations for *ambitious*, *persistent*, and *well-rounded youth* although the difference in expectations between *persistent* and *average* youth was not statistically significant. Teachers reported the lowest educational expectations for the *multiple-disadvantage* and *work-focused* youth, but the difference between these two groups was not statistically significant. The clusters themselves

evidenced greater separation, but it is important to note that students were asked about their educational aspirations whereas teachers were asked to report on their educational expectations for their students. Findings on teacher reported PSE expectations generally support patterns found from the student's self-reports, but these findings also suggest that the students have aspirations that exceed the expectations of their teachers, particularly the *persistent* youth.

Table 22

Teacher Reported Means and Standard Deviations on Cluster Educational Expectations and Grades

Variable	Sample	Ambitious	Persistent	Well Rounded	Average	Multiple Disadvantage	Work Focused
N (%)	1655 (100%)	243 (14.7%)	175 (10.6%)	515 (31.1%)	191 (11.5%)	157 (9.5%)	374 (22.6%)
1. Education Expectations	13.90 (2.03)	14.79^{a} (2.21)	14.10^{bc} (2.07)	14.41^{ab} (2.07)	13.83^{c} (2.07)	12.88^{d} (1.47)	12.93^{d} (1.34)
2. Grades	5.67 (1.71)	6.26^{a} (1.55)	6.16^{ab} (1.56)	6.31^{a} (1.41)	5.79^{b} (1.64)	4.60^{c} (1.49)	4.55^{c} (1.60)

Note: All ANOVAs are significant at p < .001 (1. $F(5, 1460) = 41.32$, $\eta^2 = .12$; 2. $F(5, 1487) = 76.01$, $\eta^2 = .20$). Group means in each row that share a superscript do not differ significantly at $p \leq .05$.

In terms of grades, teachers also reported higher grades for *ambitious*, *persistent*, and *well-rounded* youth although the difference in grades between *persistent* and *average* youth was not statistically significant. Also, although cluster results indicated differences between the *ambitious* and *well-rounded* youth on grades, teachers reported no statistically significant differences between the *ambitious*, *persistent*, and *well-rounded* youth on grades. Finally, similar to the cluster results, teachers reported the lowest grades for *multiple-disadvantage* and *work-focused* youth.

In summary, teacher reports suggested that the final cluster solution did result in distinct clusters, with teachers generally having higher educational expectations and grades for

ambitious, *persistent*, and *well-rounded* youth when compared to *average*, *multiple-disadvantage*, and *work-focused* youth. However, it should be acknowledged that complete group separation was not achieved. In general, teachers viewed *multiple-disadvantage* and *work-focused* youth as similar, as well as *ambitious* and *well-rounded* youth, and *persistent* and *average* youth on both grades and PSE expectations. One potential explanation for this lack of greater cluster separation based on teacher reports is the finding that teachers are more likely to base their educational expectations of their students on actual academic performance when compared with the parents or the students themselves (Mistry et al., 2009; Goyette, 2008).

APPENDIX E: MISSING DATA ANALYSIS AND IMPUTATION PROCEDURES FOR MULTINOMIAL LOGISTIC REGRESSION

Multiple imputation (MI) was used to estimate missing values on perceived barriers and schooling experiences. Prior to MI, missing data analysis was used to determine whether data were suitable for MI. This section includes a brief discussion on missing data analysis and an evaluation of the MI procedures employed to create the analytic dataset. Evaluation of missingness was assessed using SPSS 24.0 and STATA 13. MI and evaluation of the quality of the imputed datasets was completed using STATA 13.

Missing data. Frequency of missing data by variable is included in Table 12. Listwise deletion due to missing data would result in the loss of 17.5% of cases. The career exploration scale (10.0%) had the most missing data. Although levels of missingness varied, overall 93.9% of the sample was missing data on less than three of 10 items included in the models. Scales that appeared near the end of the survey typically had more missing data compared to scales at the beginning of the survey. This may reflect that fact that the survey administration was timed and included items across a large range of domains. Some students may have experienced survey fatigue given that the survey took about 45 minutes to complete.

MI assumes certain patterns of missingness. Generally, there are three patterns of missingness: Missing Completely at Random (MCAR), Missing at Random (MAR), and Missing Not at Random (MNAR). Data that are MCAR or MAR are amenable to MI, but data that are MNAR (i.e., missing data itself would predict missingness if those data were available) require sophisticated imputation procedures that can be challenging to implement (Enders, 2010). As such, the analytic dataset was evaluated in terms of MCAR, MAR, and MNAR with the goal of demonstrating that the data were MCAR or at a minimum MAR.

Data for this analysis were submitted to Little's MCAR test and the results were statistically significant, χ^2 (229) = 372.95, $p < .001$, indicating that missingness could not be assumed to be MCAR. Although there is no direct statistical test to assess the MAR assumption, demonstrating that analytic variables or other variables in the available dataset predict missingness supports the assumption that MAR has been met. In order to assess the MAR assumption, a series of dummy variables were created for each item with missing data (0 = not missing; 1 = missing) and a series of logistic regression models were estimated with robust standard errors[50] for each item to predict missingness. Based on prior research by HSA investigators, academic achievement was entered into the logistic regression model to predict missingness for each item. Across the 46 items[51] with missing data, students' academic achievement predicted missingness for 26 variables at $p < .05$, and 8 variables were marginally significant with $p < .10$. In all cases, students with lower academic achievement were more likely to have missing data even if the difference was not statistically significant.[52] These results provide reasonable support for meeting the MAR assumption.

Finally, MI assumes that missing data are not MNAR. The assumption here is that the missing values themselves predict missingess as respondents may be unwilling to answer given what their answer might be (e.g., substance user not wanting to affirm substance use). Unfortunately, there is no way to formally evaluate the MNAR assumption with this dataset as the original investigators did not follow up with students to understand why they did not answer certain questions, or to obtain the missing data not collected with the first administration.

[50] To account for students nested within schools.

[51] Because imputation was performed at the item level, missingness was also assessed at the item level. Scales were derived from the imputed items.

[52] It should be noted that some non-significant findings may be related to the fact that some individual items had little missing data which may have reduced the power to detect significant differences.

However, given the survey was timed, length of the survey, patterns of increasing missing data near the end of the survey, evidence of increased missingness among lower achieving students, and the questions themselves did not appear to be sensitive (e.g., illicit drug use), it seems reasonable to assume that missingness resulted from survey fatigue or a general unwillingness to complete all items more so than an unwillingness to answer particular items. Taken together, these results suggest that the data were suitable for MI.

Multiple imputation. MI was performed using the Multiple Imputation with Chained Equations (MICE) procedure in Stata 13.0. The MICE[53] procedure was selected because the analysis required the imputation of both categorical and continuous variables which cannot be accomplished with other multivariate imputation procedures. Gender and race/ethnicity[54] and variables used to generate the work-bound clusters were included in the imputation model to improve estimation of missing values and 50 datasets were imputed to improve the stability of parameter estimates (Enders, 2010). The quality of the imputed datasets was assessed by comparing the pooled descriptives from the imputed data to the original dataset for the entire sample and by clusters. In addition, trace plots of estimated parameters by imputation iteration were generated to assess model convergence and to detect any patterns that would suggest problems with the imputation. Results of these efforts did not indicate any problems with the imputation procedure or imputed datasets.

[53] Formerly the ICE add-on procedure developed by Royster (2004). In Stata 11 and beyond MICE was created as an imputation option within Stata by Stata developers.

[54] Gender and race/ethnicity variables were not imputed, resulting in 13 cases with clustering results being dropped prior to MI.

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